7-15-1990

Administrative Design for Yakima-Klickitat Production Project: Final Report

Jack Churchill
Portland State University

Lee Shissler
Portland State University

Sheldon Edner
Portland State University

Randy Smith
Portland State University

FINAL REPORT

ADMINISTRATIVE DESIGN FOR YAKIMA-KLICKITAT PRODUCTION PROJECT

JULY 15, 1990

Administrative Design Team
Center for Urban Studies
Portland State University
Portland, Oregon

Prepared by:

Jack Churchill
Lee Shissler
Sheldon Edner
Randy Smith

Acknowledgements

This report is a result of the participation and cooperation of many individuals concerned with the Yakima/Klickitat Project. We regret that we cannot thank each one personally. We are indebted to the people acknowledged here for more than just the reasons listed.

- Roy Sampsel, the Project Leader, who got us up to speed on the project and furnished us with invaluable guidance.

- The staff of the Northwest Power Planning Council, who briefed us on project genesis and provided us with a great deal of documentation and references.

- Policy and management staff of Bonneville Power Administration, Washington Department of Fisheries, Washington Department of Wildlife, and the Yakima Indian Nation, and the project consultants, who tirelessly worked through our group dynamics exercises.

- The staff of Bonneville Power Administration, and Tom Clune in particular, for responding quickly to our requests for information.

- The policy, management and technical representatives of the Yakima Indian Nation, particularly the Fisheries Program, who helped us arrange interviews with tribal policy makers and set up tours of YIN facilities.

- Members of EDWG, who provided invaluable insight into the workings of project technical management and scientific processes.

- The more than seventy individuals who contributed to our interview questions and completed the modified Delphi questionnaire.

- All the many people involved with the project who, without exception, generously tolerated our demands on their valuable time and rearranged their very full schedules to accommodate our investigation.

- Bonneville Power Administration, for funding our investigation.

Executive Summary.

This report provides the administrative design to implement the Yakima/Klickitat Production Project. This project is a scientifically designed salmon fishery restoration project funded by the Bonneville Power Administration in compliance with the fishery policies established by the Northwest Power Planning Council under the authority of the Northwest Power Planning Act.

This project breaks new ground in the field of fishery management. It is the first full scale application of supplementation technology directed toward maintaining and rebuilding native fish stocks and sub stocks with hatchery rearing methods. The work of the organization is an inherently more complex production function than traditional fish hatchery operations. This is in part because the project requires a high level of continuing quality control. It is also due in part because the fisheries management takes place over an extended geographical space of the watershed.

The pre-design work for this project has been underway since 1987 by an *ad hoc* planning group composed of representative of the Yakima Indian Nation, the Washington Department of Fisheries and the Washington Department of Wildlife, and private consultants under funding of the Bonneville Power Administration. The project experimental design has been developed by the Experimental Design Work Group. The Bonneville Power Administration is contracting for design and construction of the fish rearing facilities.

The research challenge was to design an organization to implement the adaptive management concept of biological systems management. The management of complex biological systems such as salmon fish runs is characterized by a high degree of uncertainty.

Management for uncertain outcomes requires an organizational process that will induce a continuing learning atmosphere. Over time, most bureaucratic organizations suffer from inertia and are not conducive to a learning environment.

Research methods involved the review of literature and related administrative experience, an interview process, a modified Delphi questionnaire, a series of group dynamic exercises, and observation of the work teams during the last six months of the planing process.

The results of our research suggest that a new non-profit corporation be formed to implement the program under the direction of the three primary fish management basin agencies. The corporation should have flexibility and the organization will be phased in during the five year planning and construction cycle. A primary result of our research is the conclusion that the team management concept be the dominant organizational unit for both management of field operations and for management of scientific design and evaluation.

A primary purpose of program implementation is to demonstrate success or failure of alternative methodologies to breed and rear different salmon stocks. A high degree of quality control from the bottom to the top of the organization will be essential, as will effective data management and information systems. Finally, continuous evaluation of project outcomes is central to the mission of the agency.

A fundamental dichotomy inherent in the YK Project planning organization, and in all of the US and Canadian governmental fishery organizations, is that between fish production and fish research. This dichotomy was articulated in most of our interviews and the Delphi process. If either production or research in its traditional organization value sense comes to dominate the organization, the chance of successful achievement of the project mission is diminished. Our administrative design develops institutional arrangements and administrative processes to unite these two policy thrusts.

Table of Contents.

Authority and Scope..... 1
Research Methodology..... 1
Institutional Arrangements for Implementation..... 2
Organizational Components for Adaptive Management..... 4
Formal Organization..... 6
Evolution of the Organization - Step 1..... 7
Evolution of the Organization - Step 2..... 8
Evolution of the Organization - Step 3..... 9
Evolution of the Organization - Step 4..... 10
Phasing in the organization..... 11
Adaptive Management and Organizational Constraints..... 15
Decentralized Facilities..... 15
Learning..... 16
Keeping the Organization Small..... 17
Internal and External Communications..... 17
Quality Control..... 17
Annual Operating Plan..... 18
Interorganizational Arrangements..... 18
The Project as an Ad Hoc Planning Organization..... 19
Choosing Institutional Alternatives..... 21
Discussion of Choices of Institutional Alternatives..... 23
Organizational Components of the YK Project..... 25
Abbreviations..... 64

Appendix A: Interviews.
Appendix B: Modified Delphi Survey.
Appendix C: Group Dynamics.
Appendix D: Annotated Bibliography.
Appendix E: Scoring Matrix for Rating Institutional Alternatives.

List of Figures.

1: Policy and Oversight Guidance for YK Corporation. 3
2: Organizational Components of the YK Supplementation Project. 6
3A: Yakima/Klickitat Formal Organization - Step 1. 7
3B: Yakima/Klickitat Formal Organization - Step 2. 8
3C: Yakima/Klickitat Formal Organization - Step 3. 9
3D: Yakima/Klickitat Formal Organization - Step 4. 10
4: Phasing In the Organization. 11
5: Organizational Building Blocks. 14
6: Decentralization. 16
7: Relationship of Individual Growth to Organizational Performance. 16
8: Scoring the Different Institutional Alternatives. 21
9: Relationship Between Organizational Components. 26
10: EDWG Planning Flow. 40

Authority and Scope.

The Northwest Power Planning Council (NPPC), in its October 15, 1987 master plan for the Yakima/Klickitat Production Project (YKPP), required a study of the administrative arrangements necessary to implement an adaptive management strategy for supplementation of fish runs in the Yakima and Klickitat subbasins. This report sets forth the analysis and recommendations of the Portland State University Administrative Design Group for the design of the management structure to implement the supplementation program.

The Administrative Design Group, working under a contract with RHS and Associates, funded by the Bonneville Power Administration, was charged in December 1989 with reviewing and evaluating alternative organizational and administrative structures and polices for management of the fishery restoration program in the Yakima and Klickitat subbasins. The organizational design is directed both to the unique nature of the project and the multi-year phasing in of organizational structures and components in planning, constructing and implementing the fish rearing facilities within the context of adaptive management as directed by the Council. The task of organizational design faces the challenge of a five to ten year phase-in and the requirement of a twenty to fifty year institutional memory.

Research Methodology.

Five Research methods were employed by the PSU team conducted as an integrated, iterative process. These include:

1. A review of the literature and secondary sources that have application to organizational design and dynamics for the implementation phases of the Yakima Klickitat project.

2. Interviews with over 50 key project participants and knowledgeable governmental program administrators.

3. A modified Delphi questionnaire to determine the range of professional judgement among project participants on key organizational issues.

4. Group Dynamic exercises with key project and agency participants to define organizational objectives and tasks, describe management needs, and observe interorganizational relationships.

5. Observation of planning activities and meetings of participants.

The results of each of these research activities were reported in our Interim Report, and have been revised in Appendices A through D of this report.

Institutional Arrangements for Implementation.

Our conclusion is that the YKPP implementing organization must be a joint powers institutional arrangement. Our recommendation for organizational design of the Yakima Klickitat project is a corporate model. We recommend that a non-profit corporation be chartered by the Yakima Indian Nation, as the designated lead agency, and authorized through interagency agreement by the Washington Department of Fisheries and the Washington Department of Wildlife under the Interlocal Cooperation Act, Chapter 39.34 RCW. As the established fisheries management agencies, WDF, WDW and the YIN have management and protection responsibility for salmon and steelhead resources in the Yakima and Klickitat basins.

A joint powers arrangement must meet three basic criteria:

> First, it must have a sense of mission and the ability to achieve that mission.
>
> Second, it must effectively represent the interest of the responsible fisheries management agencies in the basin and be able to utilize and integrate the resources of each of the agencies in a cost effective manner.
>
> Third, it must have sufficient authority, technical expertise, and administrative capability to contract with the Bonneville Power Administration to implement an Operation and Management Agreement, and conduct experimental design, research, monitoring, evaluation, and demonstration requirements of the project.

We further recommend that the implementing agency should be a new, single purpose agency not encumbered with traditional technical or bureaucratic constraints of past fish hatchery management.

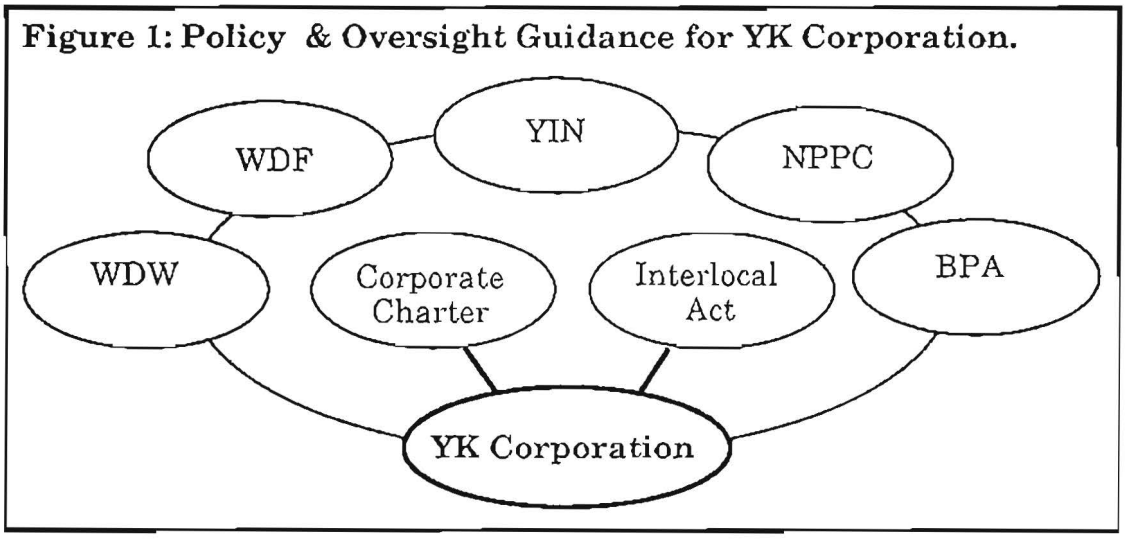
Organizational structure must be designed to provide creativity and cooperation in this marriage of fish production and fisheries science in a full scale application of adaptive management. One of the major concerns threading through our Delphi survey and personal interviews was the inherent conflict between research and fish production in most governmental fish management organizations.

The present Management Entities Policy Group (MEPG) would become a three member Board of Directors (BOD). Each management agency would delegate its management authority to a single Director, who would be empowered to represent his or her agency in YKPP policy decisions. Each board member would have significant responsibility to communicate with interested publics, fisheries management professionals, representatives of governments and agencies in the Columbia Basin, and the general public.

Each board member must have the trust of and access to top management of the fisheries management organizations. Each board member will have dual loyalty -- to the Yakima/Klickitat organization, and to his or her own agency. This dual loyalty will strengthen the organization by establishing closer relationships between the YK organization and the fisheries management agencies in the Columbia Basin.

The Board of Directors would be governed by policies enumerated in the Corporate Charter and the Interlocal Agreement, and by Yakima Indian Nation tribal authority, and Washington state law. Policy guidance and operational oversight will also flow from the Northwest Power Planning Council through its Fish and Wildlife Management Plan and project approval guidelines, and by Bonneville Power Administration through its Operation and Management Agreement and Annual Operating Plan process. This combination of policies and agreements will insure consistency with the mission and goals of each participating agency and the YK Corporation. (see Figure 1)

Figure 1: Policy & Oversight Guidance for YK Corporation.



Funding for operation and maintenance will be provided by the Bonneville Power Administration. The YK Corporation will have authority to contract with other agencies and receive monies from tribal, state and federal sources.

As the YK Corporation moves from a project mode to a program mode, and from planning to implementation, the Project Manger will become a Chief Executive Officer (CEO). The CEO has the major management responsibility for both program development and implementation. The primary qualification for this job is demonstrated management ability in scientific administration. The CEO will have the major role in defining and implementing appropriate interorganizational and public working relations.

Because of the dual science-production mission of the project and the critical need to develop and maintain a learning environment from bottom to top, we

recommend a team management structure in the field offices. Team management systems which evolve from the quality circle experience will provide the demand for individual vertical and horizontal growth. Through a team management design that moves people across jobs and requires constant training and individual learning, the organization has a reasonable chance of accomplishing its mission.

Team management is an effective means to resolve the Indian/non-Indian and professional/subprofessional issues in organizational culture.

Team management organization strategies must also be established at higher levels of the organization to integrate scientific and production managers, and to incorporate scientific project results into the fish production process. EDWG is already using many team management approaches and, with professional facilitation, could establish a model process for the organization.

Team management should eliminate the need for layers of hierarchy in the organization. When fully operational, the organization should require no more than two tiers of hierarchy. (see Figures 3C & 3D on pages 14 & 15) In the early stages of step 2, three levels of hierarchy may be necessary.

One of the strengths and key linkages between the YK Corporation and each of the participating organizations will be the built in mobility opportunities of YK personnel to plan career opportunities in all four organizations.

Organizational Components for Adaptive Management

The complexity of the YKPP tasks, as perceived by project participants, led the Administrative Design Team to adapt an organizational model that would provide the foundation for understanding all of the formal and informal components that need to be addressed in organizational development in a changing environment. We adapted the Stream Analysis methodology for functional task analysis, developed by Professor Jerry Porras at Stanford University School of Business. This model provides for identifying critical directional interactions between organizational components, planning interventions and change in the organization, and tracking the organizational development process. Our research identified critical organizational components and they are arranged in four major categories called streams, as illustrated in Figure 2.

The categories are:

1. Organizational Arrangements, which include the formal structure, goals and strategies, human resources planning, and administrative processes.

2. Social Factors, sometimes described as informal organization, encompass all things directly related to people in the organization. This grouping explicitly recognizes that individual behavior and growth will significantly impact organizational outcome. The critical components are organizational culture, the people interactive process, social networks, individual development and informal communication.

3. The third stream describes the organizational components of the technology of the organization. Since this organization is pioneering the first full scale implementation of supplementation technology, the technology imperatives of the experimental design are the main driving force of the design and functioning of the organization. Components include technical expertise, job design, technical guidelines and procedures, and the technical processes of monitoring and evaluation.

4. The fourth stream deals with the physical design of the facilities and the geographic space to be managed. Winston Churchill in his third memoir expressed the notion that the physical surroundings of government largely influence the behavior of the organization. The components that are dealt with in this stream are the architectural layout of the facilities and the challenge of managing the fisheries resource over extensive geographic space.

Figure 2: Organizational Components of the YK Supplementation Project.

ORGANIZING ARRANGEMENTS	SOCIAL FACTORS	SUPPLEMENTATION TECHNOLOGY	PHYSICAL SURROUNDINGS
A. Goals. 1. Productivity. 2. Stock Enhancement. 3. Information Exchange. B. Strategies. 1. Build & Manage Facility. 2. Demonstration. 3. Quality Control. C. Formal Structure. 1. Annual Operating Plan. 2. Board of Directors. 3. Policy Advisory Committee. 4. Headquarters. 5. Field Offices. 6. EDWG. 7. Org Devel Cmte. D. Human Resources Planning. 1. Recruitment. 2. Training. 3. Growth. 4. Scheduling. 5. Pay & Benefits. 6. Tenure. 7. Staffing Level.	A. Organizational Culture. 1. Indian/non-Indian. 2. Professional/ sub-professional. B. Interaction. 1. Personal. 2. Public. C. Social Network. 1. Formal communication. 2. Informal communication. 3. Problem solving.	A. Technology Imperatives. 1. Technical Expertise. 2. Job Design. 3. Work flow design. B. Technical Parameters. 1. Guidelines. 2. Procedures. C. Technical Processes. 1. Learning 2. Monitoring. 3. Evaluation. 4. Record Keeping. 5. Information System.	A. Physical Design B. Spatial Configuration. C. Decentralization.

The discussion of each of these components and some of the key interrelationships are found starting on page 30. They are arranged in "windows" so that they can be inserted into a computer program. The basic analytical program is being developed by Stanford University, and the PSU Administrative Design Team adapted it to meet YKPP needs.

Formal Organization.

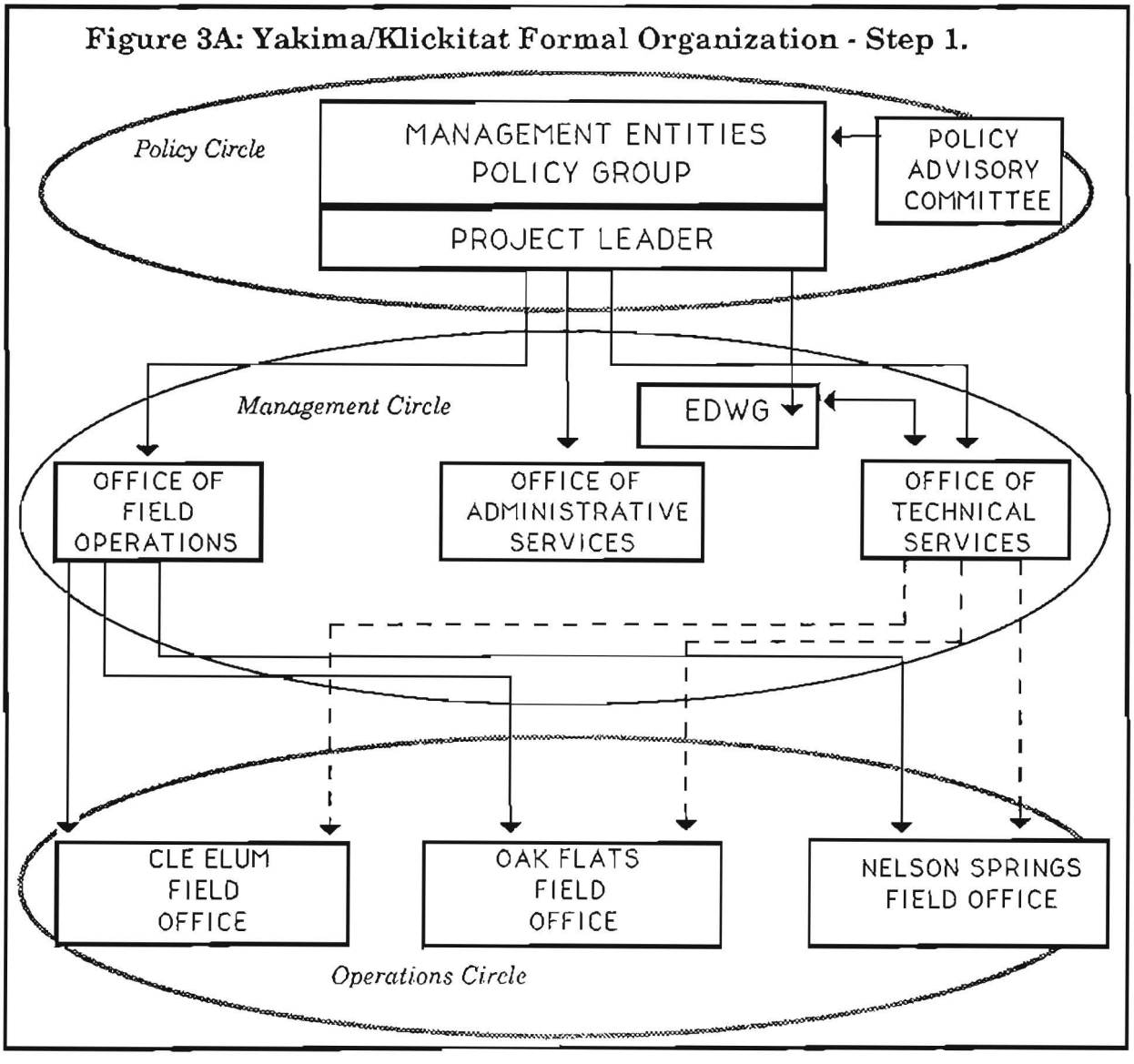
The formal structure is designed to implement a program of fishery management supplementation. It recognizes the unique production function of this project and integrates the fish facility management work with the scientific and experimental work. It provides for parallel staffing, decentralization, flexibility, and team management. It should be viewed as a long-range target that the project should start working toward. It is to be regarded at this time as a design concept. Responsibilities assigned to the parts of the structure will be guided over time to meet the needs of the organization as it moves to planning, construction, and implementation.

Evolution of the Organization - Step 1.

The step 1 organization,as illustrated in Figure 3A, is largely descriptive, and stems from our observations of the *ad hoc* planning process. Although it is doubtful that step 1 structure will still be in place when all field offices are operational, we have included them in Figure 3A to show how field office arrangement evolves. We also expect that the organization will progress beyond step 1 before the Policy Advisory Committee is activated.

Step 1 represents a traditional, hierarchical organization. Authority flows from the top down. Policy, management, and operations are separated in three distinct levels. This is not the desired organizational structure, and should be viewed only as transitional.

Figure 3A: Yakima/Klickitat Formal Organization - Step 1.

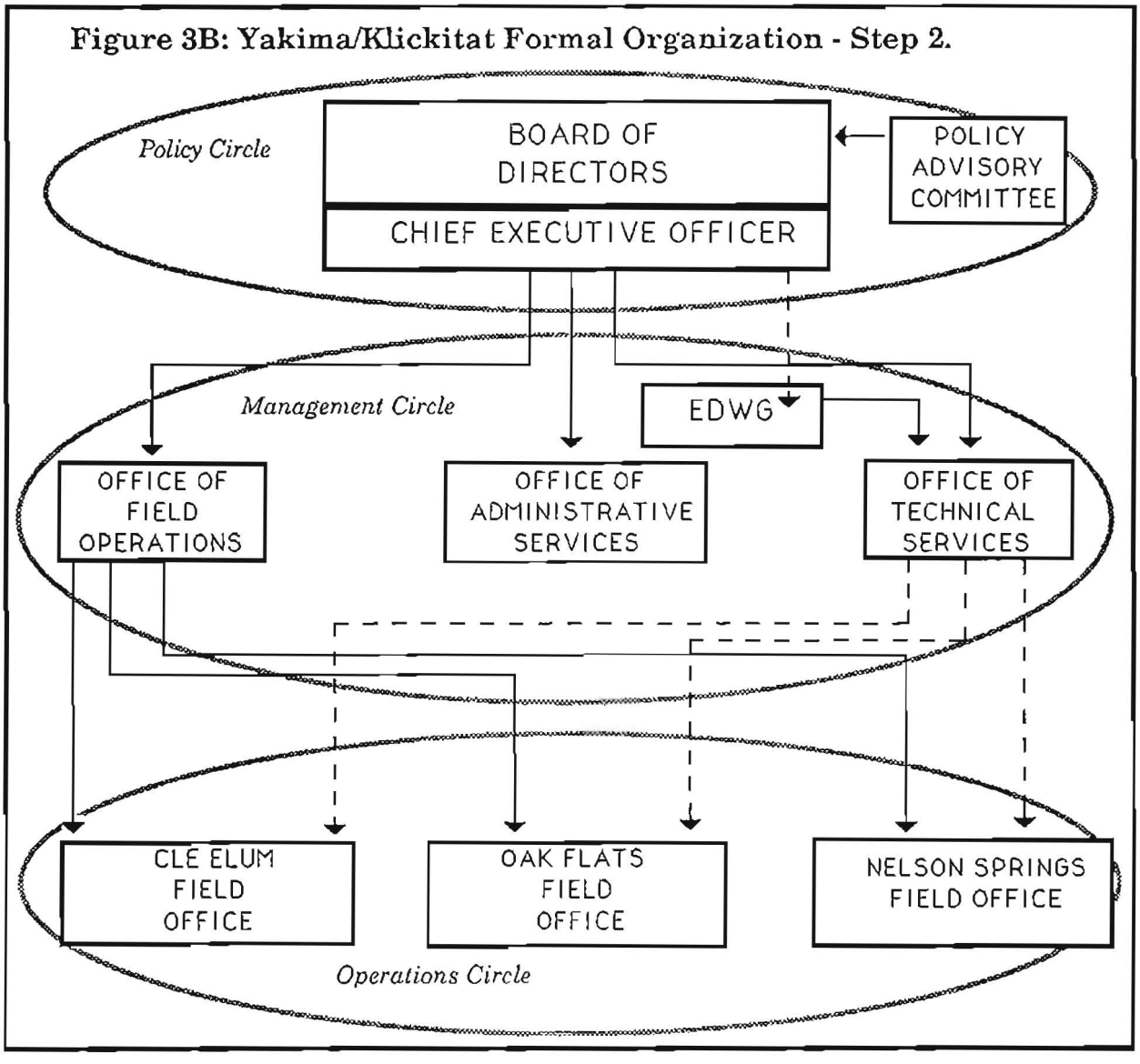


Evolution of the Organization - Step 2.

Step 2, as illustrated in Figure 3B, represents the move to a non-profit corporation. The current MEPG becomes the Board of Directors, and the Project Leader becomes a Chief Executive Officer. They will need to devote the majority of their time to the YK Corporation, and have relatively few other duties within their own organizations.

Step 2 emphasizes team building. EDWG has stated a desire to establish quality circles in developing experimental design and annual work plans. Similar efforts should be instituted in field office operations. Initial quality circle activity is expected to evolve into team management during step 2.

Figure 3B: Yakima/Klickitat Formal Organization - Step 2.

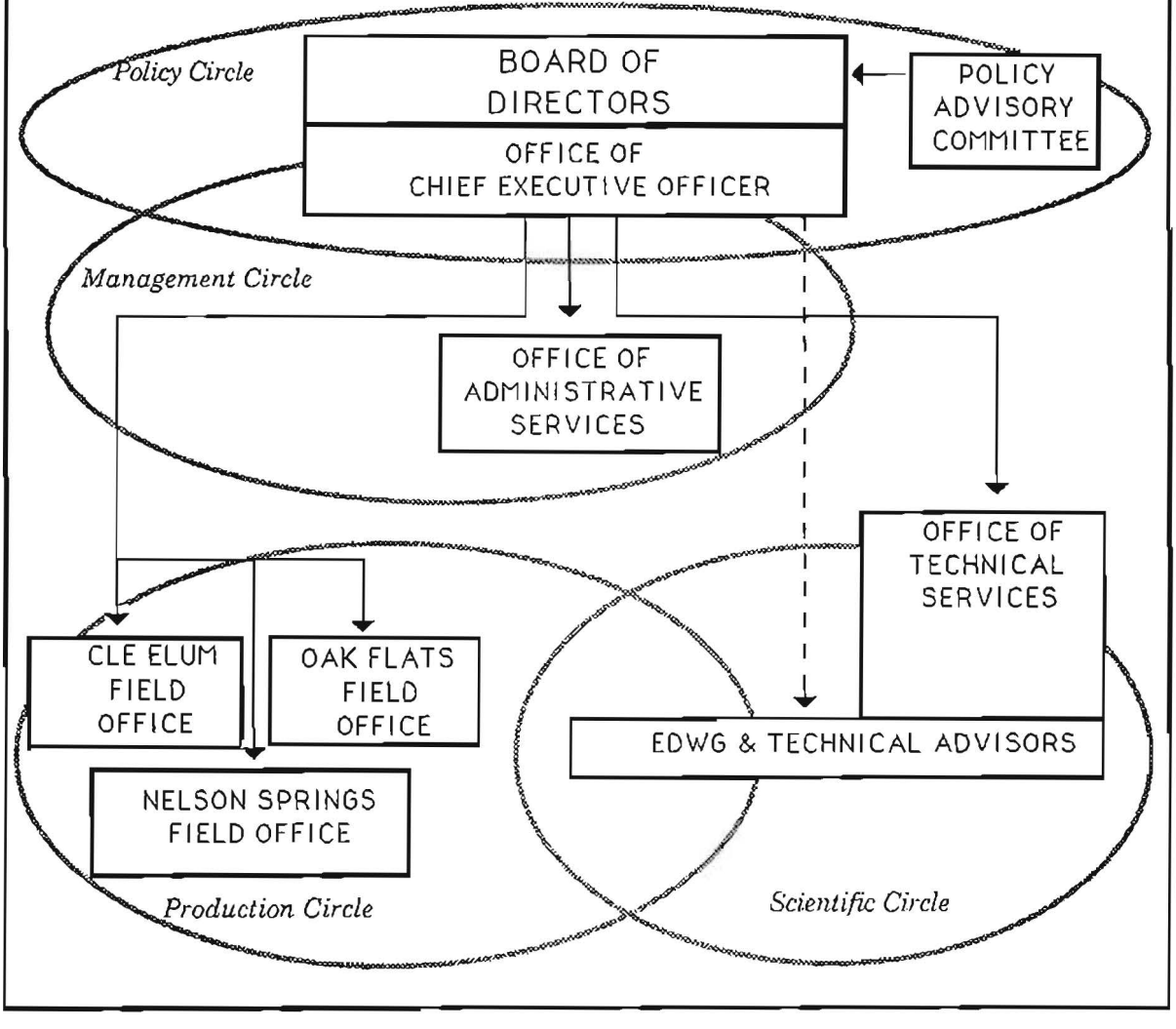


Evolution of the Organization - Step 3.

Step 3, as illustrated in Figure 3C, marks a transition to team management and elimination of bureaucratic hierarchy. This is perhaps the most challenging step for the organization. The organization will have two levels of hierarchy. Lines of authority are still present, but bottom-up management should be a recognized process. Field offices will be integrated into a production circle. Scientific and production activity will be closely integrated during step 3.

Quality circles will be replaced by team management. This depends upon step 2 efforts at recruitment, training, growth and mobility. Top management must promote change, so that quality circles are a developmental step, rather than ends in themselves.

Figure 3C: Yakima/Klickitat Formal Organization - Step 3.



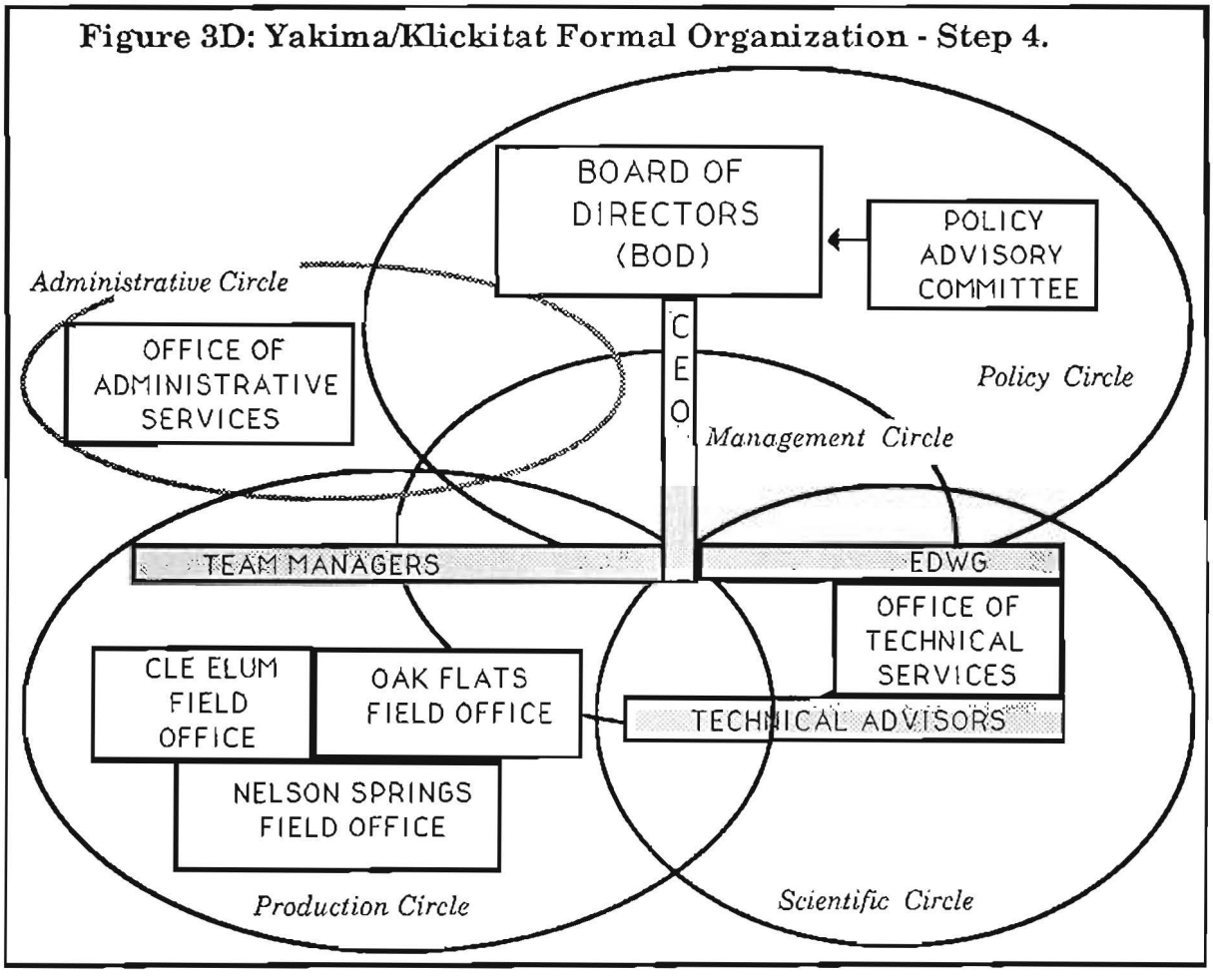
Evolution of the Organization - Step 4.

Step 4, as illustrated in Figure 3D, will occur through an ordered sequence of development. There must be a commitment to constructive change. The Organizational Development Committee, using the stream analysis organizational development tool, will prove crucial in this effort.

We wish to emphasize that an organization capable of adaptive management of a fisheries resource **cannot** simply be mandated. It must occur by planning and investment in individuals and the organization.

In the non-hierarchical organization illustrated in Figure 3D, team management replaces traditional lines of authority. There is very little compartmentalization found in most organizations. Employees at all levels have a variety of technical skills, and are encouraged to participate in management. The flow of communication and evaluation is horizontal, rather than vertical.

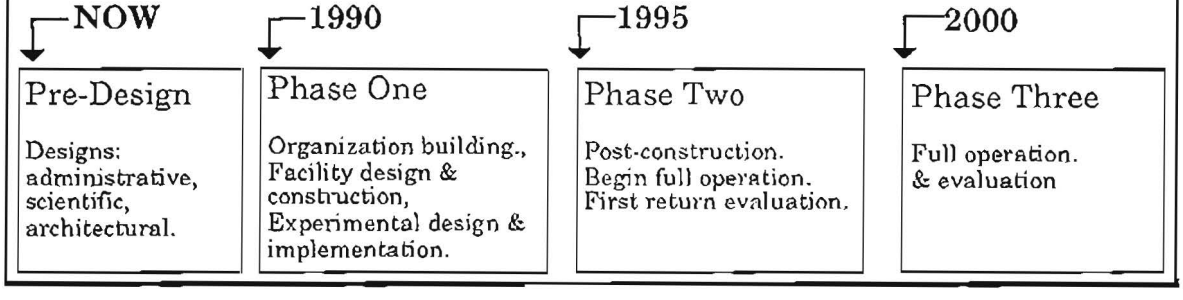
Figure 3D: Yakima/Klickitat Formal Organization - Step 4.



Phasing in the organization.

While the birth and infancy of the YK Project during the pre-design and design phase is closely akin to the *ad hoc* planning development models of the aerospace and electronics industries, the transition to implementation will take several years as the project moves from pre-design, to design, to construction, and finally to operation. Phasing in the organization is a particularly important concept for the YK project . (see Figure 4)

Figure 4 :Phasing in the Organization.



The basin management regime will require a long range, incremental staffing and training strategy if cost effective management is to be achieved. The critical challenge for organizational management is that the job task and responsibilities will change during the phasing in period.

We have made two important recommendations to deal with this long gestation period. First, if organizational development is going to be a rational process, then an Organizational Development Committee of key players must monitor and adjust the organizational development strategy. Second, our report is developed with organizational components which can evolve into a planning and tracking model. If these two recommendations are followed, then the managers can direct, control, and react to changing organizational needs in a timely fashion.

We have outlined below some of the critical organization building blocks and built a simulated Gantt chart covering the next two years. This chart should be added to and kept current. (see Figure 5)

Jul 1, 1990 -- Recruit interim field operations director.
Jul 20 - 30, 1990 -- BPA print report.
Aug 1 - Sep 15, 1990 -- Review of PSU administrative design report and recommendations by MEPG and appropriate authorities in YIN, WDW, WDF, BPA and NPPC.
Sep 1, 1990 -- Development of FY contracts in the context of an integrated and internally consistent annual operating plan.

Sep 1, 1990 -- Appointment of Organizational Development Committee (ODC).

Sep 1, 1990 -- Designate YK Charter Development Committee and responsible individuals in YIN, WDF and WDW.

Sep 1 - Oct 15, 1990 -- ODC review and recommendations to Project Leader and MEPG on YK Corporate organization building schedule.

Sep 1, 1990 - Oct 15, 1990 -- Develop strategy document of task assignment and decision points for legal charter documents, including non-profit charter and Interlocal Agreement. Review and approval by MEPG.

Sep 1, 1990 - Apr 1, 1992 -- Use annual operating plan process and format for continuous project tracking and future year planning.

Oct 1, 1990 -- Appoint Human Resource and Team Management Planning Committee (HRTMPC).

Oct 1, 1990 - Jan 1, 1991 -- Write salary, benefits , mobility, tenure, training and reward policies

Oct 15, 1990 - Feb 15, 1991 -- Schedule and contract for development of administrative procedures, including contracting, budgeting, and auditing.

Oct 15, 1990 - Jan 15, 1991 -- Design Office of Field Operations and include strategy to shift field organization and Office of CEO in phase two.

Oct 15, 1990 - Feb 1, 1991 -- Draft legal charter documents and reach appropriate agency staff approvals. All potential conflicts to be forwarded as information to MEPG on a routine basis as they are identified.

Nov 1, 1990 -- Review administrative design report and recommend revised schedule of organization development.to MEPG.

Nov 1, 1990 -- MEPG review recommendations and make decision on use of PSU Computer development model.

Nov 1, 1990 - Jan 1, 1991 -- Design of initial cut at field team management organization for Cle Elum. Transmit spatial needs to BPA and architect.

Nov 1, 1990. -- Forward document authorizing negotiation on strategy paper to final approving authorities of each of the managing agencies.

Nov 15, 1990 -- MEPG approve organization development schedule.

Nov 15, 1990 -- Adapt stream flow computer model and enter organizational component information in organization planning and tracking systems.

Jan 1, 1991 - Feb 1, 1991 -- Review and approval by MEPG of personnel policies.

Jan 1 - Mar 15, 1991 -- Develop work flow and job designs for key personnel in Office of Technical Services (OTS).

Jan 1 - Mar 15, 1991 -- Develop evolving organizational design for EDWG and EDWG relationships to OTS, CEO and BOD.

Jan 15 - Apr 15, 1991 -- Design Office of CEO, Board of Directors, and Policy Advisory Committee.

Jan 30, 1991 - Feb 1, 1991 -- Review BPA and architect comments and reach agreement on physical design.

Feb 1 - 30, 1991 -- MEPG review and approve documents and forward to appropriate approval authorities.

Feb 1 - May 1, 1991 -- YIN, WDF and WDW write and approve internal job description, communication and reporting requirements of their members of the Board of Directors.

Feb 1 - Jun 30, 1991 -- Take technical monitoring and data dictionary requirements from EDWG and translate into complete work flow design, job analysis, and team management organizational structure for Cle Elum field office, using team management organization concepts.

Feb 1- Jun 30, 1991 -- Develop personnel handbook rules and procedures.

Mar 1 - Jun 1, 1991 -- YIN, WDW and WDF approval of charter documents.

Apr 1 - Jul 15, 1991 -- Draft Charter supplementary documents.

Apr 15 - Jun 1, 1991 -- Design Employee Training program for field and professional personnel for FY 92.

Jun 1, 1991 - Sep 15, 1991 -- Develop policy and administrative manual for team management and organizational communication

Aug 1 - 15, 1991 -- MEPG approve supplementary documents.

Aug 1 - 30, 1991 -- Draft job description for CEO and establish job search strategy.

Sep 1, 1991 -- Advertise CEO job.

Sep 1, 1991 -- Management Entities Policy Group formalized as Board of Directors and appointments made by each agency appointive authority.

Oct 1, 1991 -- Centralize all BPA contracts for FY 92 within YK BOD.

Jan 1, 1992 -- Have management arrangements finalized for all appropriate fish management facilities and activities of YIN, WDF, and WDW in context of FY 92 annual operating plan.

Jan 15, 1992 -- Sign Contract with CEO.

Mar 1, 1992 -- CEO reports for duty.

Apr 1, 1992 -- Develop FY 93 annual operating plan under authority of O&M agreement.

Adaptive Management and Organizational Constraints.

Adaptive management is a systems approach to project administration that is particularly suited to dealing with the uncertainties of human control of a biological resource. The key is establishing a learning environment. This is easier said than done. Comparative public administration offers few, if any, examples where the primary purpose of the future bureaucracy is to deal with change over a long period of time. There is an inherent conflict between bureaucratic organization and uncertainty. "The primary function of any bureaucracy is to perpetuate itself," to repeat a familiar truism.

Setting goals and committing resources without the assurance of positive outcomes is risky business in the bureaucratic world. Recognizing and learning from failure, as well as success, is essential to avoid irreversible cataclysmic mistakes in the genetic future of the salmon runs of the Columbia Basin.

There is explicit recognition in the Council's directions and discussions that accurate measurements of program output are essential to cost effective project activity. One of the unusual features of the YKPP is that failures are not only to be rewarded, but advertised so that they will not be repeated in other projects. A particular experimental or production strategy is not a "failure" if its outcome is accurately measured and its management consequences correctly interpreted. This is contrary to the law of bureaucratic survival, but inherent in the scientific tradition.

We make the primary assumption that the YKPP is the first full scale application of supplementation technology. In addition, the project requires research design, detailed monitoring and continuing evaluation of different phases of the supplementation process over many years. The project must also serve as a demonstration for other full scale supplementation projects in the Columbia Basin. These and other factors discussed elsewhere in the report lead to the conclusion that the production function for supplementation is significantly more complex than the historic and normal public fish hatchery operation. The task is to design an organization that can effectively administer this new production function.

Decentralized Facilities.

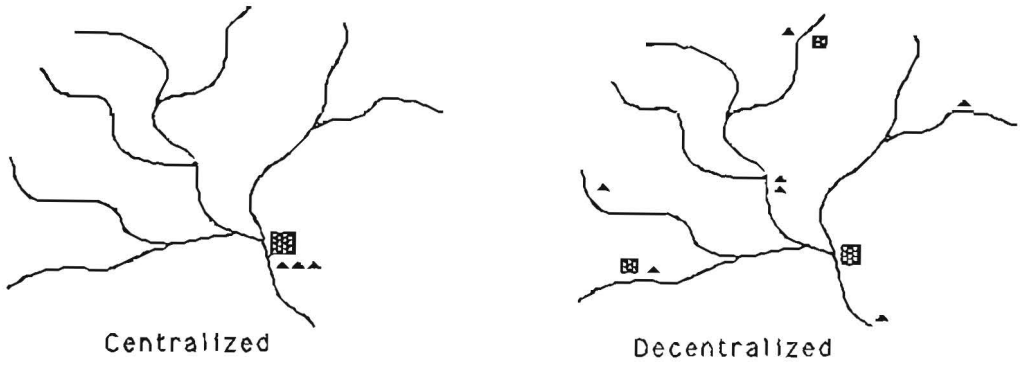
Each field organization will include a hatchery complex and will have responsibility for a large natural watershed area for taking, rearing, and monitoring fish. A traditional hatchery operation usually is confined to a small area. Adults are trapped and fish are reared on the site and dispensed with a truck. Tasks are largely repetitive.

For supplementation tasks, breeding stock will be collected at dispersed traps throughout the season. Breeding, rearing, and monitoring will take place in

a wider and more decentralized geographical setting. This leads to a much more consecutive operation than in the traditional hatchery.

The most significant point to draw from these factors is that the field employee will require substantially more exercise of site specific judgement than is found in traditional fish hatchery organizations.

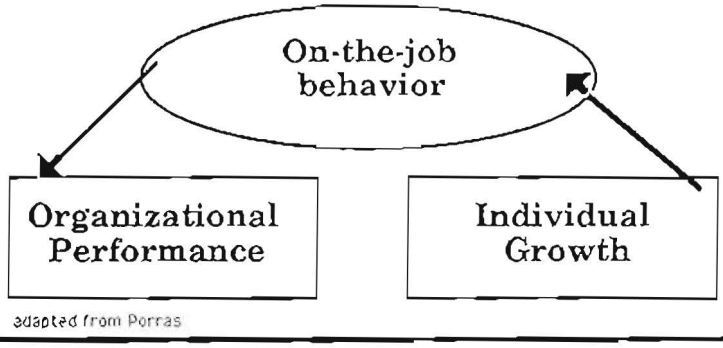
Figure 6: Decentralization.



Learning.

If adaptive management is to succeed and the goals of the supplementation project attained, then the organization must develop a unique learning environment through carefully constructed processes of communication, building the organizational culture, and constantly stimulating individual growth. Individual development influences on the job behavior, which influences organizational performance. This is why we focus on individual development in our recommendations.

Figure 7: Relationship of Individual Growth to Organizational Performance.



Keeping the Organization Small.

Large organizations develop and maintain inertia over time. Learning stops and the organization becomes resistant to change. Smaller organizations have a chance, albeit a small one, to maintain a change process.

Contracting out for work is one essential strategy. Another is to maintain a zero based program budget process, which is possible in small organizations.

Internal and External Communications.

Effective formal and informal information processes need to receive early and constant attention by management. The geographical distance separating the members of the MEPG, the Project Manager, and the project personnel require maximum use of computerized and visual information systems. The telephone and meetings have been the major means of communicating during the pre-design phase. A part of the static and conflict we identified in the *ad hoc* organization was due to lack of effective communication. There is an increase in use of the computer bulletin board, and this needs to be encouraged. Rapid communication of data on a need-to-know basis will require intentional structuring by top management. There is even more need to develop effective external communication processes and strategies if the organization is to have the support and cooperative assistance it will require.

Quality Control.

We have stressed the need to develop quality control from the bottom to top of the organization. Most scientific and resource program activities are limited by the poor quality of the data. In fact, need for high quality data was constantly stressed by most participants. Record keeping then becomes the critical link. The individual at the bottom of the organization will be responsible for collecting and recording data.

We have spent some time researching a meaningful quality circle organizational arrangement and process which we highly recommend be adopted for all appropriate units of the organization as a preliminary step toward team management.

Annual Operating Plan.

Throughout our interviews and meetings with project personnel, we hear the annual operating plan discussed as almost a deity. Yet we found a reluctance, if not an aversion to effective work planning and commitment to deadlines.

The AOP is to guide day to day operation. It is to provide the mechanism to change goals and strategies. It is to guide budget and contract scoping of work. It is to provide the basis for evaluating everyone's production throughout the year. We did not research this area very far, and it is our judgement the annual operating plan process be carefully thought out and phased into the organization rapidly. If it is to be successful, it must be defined and used in terms of an evolving process and not a plan. We commend the fact that steps were taken to begin this process for the 1991 budgeting and contracting exercises.

Interorganizational Arrangements.

The success of the Yakima Klickitat project demands the continuing structuring of interorganizational relationships. We have already commented on the growing effectiveness of the cooperative work of the three management entities. The project's survival depends on this mutuality of trust and common purpose.

The future role and relationship of Bonneville Power Administration (BPA) to each of the three participating agencies, and to the YK Project will continue to change rapidly. As documented in our interim report, there has been a great deal of friction and noise in the system. BPA has been responsible for granting and withholding funds and exercising oversight through contract compliance supervision. This role is one similar to that played by the Office of Management and Budget at the federal level. The YK project is beginning to take on much of the work plan development and contractual responsibility that BPA now performs. As the planning phase moves towards implementation, we will see many of these tasks, currently spread among numerous contractors, centralized under the Organization and Management Agreement.

The YKPP will have to develop a strategy to take over much of the interagency administration that BPA now exercises through the Technical Work Group (TWG) chair and through its contracts. Success of the project will require that the agencies dealing with water budgeting develop significantly different strategies to enhance fisheries. Special attention needs to be directed towards enhancement and protection of upstream fish habitat and to see that the subbasin plans are implemented.

The Project as an *Ad Hoc* Planning Organization.

The pre-design project has functioned as an *ad hoc* planning organization during the past three years. Today, the YK Project is in a state of transition to an implementing organization. The umbilical cord of the organization has been BPA funding and contract authority.

The BPA-YK Project Manager, operating out of the Yakima project field office, has played the key role as overall project manager. The BPA Project Manager has been the manager for work planning and contract negotiation and performance of the entire project. The BPA Project Manger has provided a key coordinating role as chair of a broad-based Technical Work Group (composed of eleven participating federal, state, Indian, regional and local agencies). The BPA Project Manager has also been a major force in coordinating the YK Project with the Stream Enhancement Screening and Passage Program. (see p. 31 of the PDR.)

The project policy has been developed within the constraints of the Power Council Directives and the Bonneville Power Administration authorities by an institution called the Management Entities Policy Group (MEPG). This group is composed of the Chair of the Fish and Wildlife Committee for the Yakima Indian Nation YIN), the Assistant Director of the Salmon Program for the Washington Department of Fisheries (WDF), and the Columbia River Basin Program Administrator for the Washington Department of Wildlife (WDW). Functioning as as integral part of the MEPG, and as project director and chief communicator, is the Project Leader, acting as a private contractor to the Bonneville Power Administration. The Project Leader has also acted as a prime contractor to Bonneville to engage several other scientific and management consultants as sub-contractors to carry out the pre-design plan requirements. These personnel have operated in several capacities including scientific research and project design, intergovernmental relations, and public information.

The YIN and the two state agencies have long histories and substantial commitments to the management of the subbasin fishery resources. They are the logical entities to direct this project within the scope of BPA and Power Council policies -- that the fisheries agencies within the Columbia Basin shall be responsible for management of fish runs restoration.

The administration of the project has been carried out under several umbrella groups:

The Experimental Design Work Group (EDWG), chaired by the Director of Research of the Yakima Indian Nation (YIN), has played the key role in developing the research design to test several stages in the full scale application of supplementation technology. This group has met together on a biweekly basis as a close team. In addition to the Chair, EDWG includes two research scientists -- one each from the WDF and WDW -- and two private consultants. In addition, the contracts officer of the BPA Division of

Fisheries sits on this group. Other contributors to the group include personnel from the WDW and WDF, YIN and the Northwest Power Planning Council.

The Yakima Indian Nation Department of Fisheries, under contract from BPA, has been designated the lead agency by agreement of the management entities. The YIN Hatchery Project Manager, the Research Manager, and Enhancement Manager all are critical parts of the pre-design planning group. A field biology crew of three professionals and twenty subprofessionals is presently engaged in establishing basic data benchmarks and developing a monitoring system for the fishery enhancement program. In addition, the YIN provides the coordinating mechanism with harvest and escapement goals.

Construction and understanding of the lead agency concept is "fuzzy" at this stage of the project. It lacks meaning because of the way the project currently operates. BPA has been the *de facto* lead agency by virtue of its funding and coordination functions.

In looking at this *ad hoc* group of individuals and organizations, we see a high degree of growth in communication and trust between individuals and organizations, and a general dedication to the purposes of the project. The success of the project is due to the leadership and the enthusiasm and dedication to the challenge of developing a full scale supplementation project through adaptive management.

Choosing Institutional Alternatives.

One of our primary tasks was to recommend the most favorable institutional setting for the YK Project. We looked at five basic options in the six months of our administrative research and consultations with project participants and many others. In evaluating the available alternatives, we relied heavily on the impact institutional setting would have on the operation of the organizational design that we developed and is discussed below. The Administrative Design Team rated each of the institutional options on the basis of how well each of the institutional settings would nurture the YK generic organizational model. All the significant organizational components were used as in the rating matrix below:

Figure 8: Scoring the Different Institutional Alternatives.

Options are in descending order of score on the organizational matrix.

OPTION	SCORE
A. Non-Profit Corporation	502
B. Status Quo	440
C. Interim Contract with USFWS	378
D. Contract to Single Agency	318
E. Contract to Private Operator	262

NOTES

1. For each management recommendation, a numerical score was assigned, based on the Administrative Design Team's estimation of how well a particular option would fulfill the recommendation.

2. The reader is cautioned that the aggregate score for each option is an estimation of how well the particular option would perform in relation to administrative and organizational design considerations. There are other considerations - technical, biological, legal and financial - not examined by the Administrative Design Team.

3. The complete scoring matrix is included in Appendix E.

Other criteria considered include:

a. The ability to contract with BPA for the O&M agreement.
b. Ability to administer land, water and fish resources under legal jurisdictions of WDF, WDW, YIN, and other private and state entities.
c. Flexibility to develop a distinct project organizational culture.

The five institutional alternatives we considered were:

A. New non-profit corporation. This alternative would require that a corporation be chartered by the State of Washington and the Yakima Indian Nation under the Interlocal Cooperation Act, Chapter 39.34 RCW. Its status would be that of a quasi-state agency, with administrative and personnel policies designed for maximum integration between state and tribal organizations. There are several precedents for this type of institutional arrangement, both within the YIN and between the State of Washington and coastal Indian Tribes.

Authority would be vested in a three person Board of Directors. Each Director would be appointed by the appropriate appointing authority of YIN, WDW and WDF. The Corporation would have considerable flexibility to establish its own administrative and operating procedures. The new organization would essentially evolve out of the ongoing *ad hoc* planning organization. The YK Supplementation Corporation will need broad powers to establish contractual arrangements with BPA for operation and maintenance of facilities, and to conduct the monitoring and evaluation requirements of the demonstration and research project. The Corporation should have wide authority to contract for implementation of its responsibilities. Since BPA normally contracts an O&M agreement for five years, we recommended that the charter and interagency agreement be reviewed and either sunsetted or renewed for another five years.

B. Status quo. This alternative would continue to expand on the present arrangement, where WDF, WDW and YIN cooperatively set policy and contribute personnel with technical and management expertise. The three agencies would continue to contract directly for specific work products. This arrangement would essentially leave BPA as *de facto* project manager, or BPA would have to contract with one of the agencies for the O&M agreement.

C. Interim USFWS contract. This alternative would involve contracting with the U.S. Fish and Wildlife Service (USFWS) for a limited period, perhaps five years. During this period, YIN technical and administrative systems would be developed, with the expectation that the YIN would become the project manager at the end of the USFWS contract. This would be similar to the arrangements that the Corps of Engineers has with the USFWS in the Lower Snake hatcheries. USFWS has experience in fish hatchery research facilities, traditional production facilities and managing fish hatcheries on Indian reservations.

D. Contract to a single agency. This alternative would involve contracting to one of the current management agencies -- almost certainly the YIN -- to operate the project through an O&M agreement directly with BPA. WDF and WDW do not want responsibility for overall project management, although they wish to remain active contractors to the management agency. YIN has been recognized as the lead agency during the pre-design phase. They have the majority of fishery personnel in the basin on their staffs and their geographic and functional responsibilities relate closely to the administrative area of the YK project. If this was just a traditional hatchery operation there probably would not be a need to search further for the management agency, but scientific requirements for quality control and the geographic area to be managed require more independence and flexibility than tribal management could provide at this time.

E. Contract to private operator. This alternative would involve an O&M agreement between BPA and a private corporation other than one of the present management agencies. Policy direction would continue to be provided by WDF, WDW and YIN, although the relationship between the management agencies and the project would not be as close as it is now.

Discussion of Choices of Institutional Alternatives.

Why did the Administrative Design Team rate one option higher than another? Why should one option be preferred over another? What evidence is there that one option would perform better than another?

In examining each of the options, the Administrative Design Team considered how well each was likely to fulfill the recommendations we made concerning organization and management.

Our recommendations indicate a decentralized, non-hierarchical, participatory organization which emphasizes continual change and team management. This causes us to favor multiple agency involvement and interagency cooperation, as well as a network of close ties between policy, management, and funding.

We believe that the formation of a non-profit corporation offers the best opportunity to implement our management recommendations. It maintains close involvement of all three management agencies, with multiple and formalized points of interaction for the funding agency. It reconciles administrative and procedural differences between the management agencies, providing for flexibility. It integrates policy and management activities by formalizing participation and interaction between all levels of the organization. It distinguishes between funding and management decision-making procedures, while integrating production and experimentation.

The present arrangement between the three management agencies and the funding agency presents an acceptable alternative if, *and only if*, there are constructive efforts at building on the trust and cooperation already established between the four principal entities. Our observations of interagency cooperation are encouraging, and cooperation can be intensified through better communication and administrative procedures.

In general, four agencies are better than one because of the variety of people, talents and resources contributed by each. The technical, administrative, budgetary and engineering experience of all four principle players has been crucial to progress so far. It is important to maintain active participation by all four agencies. This is best accomplished by keeping a "level playing field" and avoiding single agency management.

An interim contract with the U.S. Fish and Wildlife Service (USFWS) presents a moderately acceptable management alternative. USFWS has proven its ability to integrate experimentation with production, and this alternative addresses some of the problems associated with integrating technical and scientific activities into a unified supplementation technology. This alternative offers some administrative advantages because the USFWS, as a federal agency, has more resources at its disposal than any other single agency, and more flexibility in coordinating certain training and other activities with the Yakima Indian Nation and BPA.

We believe that single agency management threatens the cooperation already established by emphasizing the importance of one agency over the others. Designation of a lead agency should be approached with extreme caution during implementation, although it may present a perfectly acceptable option in the future. The Yakima Indian Nation will move toward a higher management profile, eventually assuming primary management responsibility, and this evolution should occur through the mechanism of a non-profit corporation.

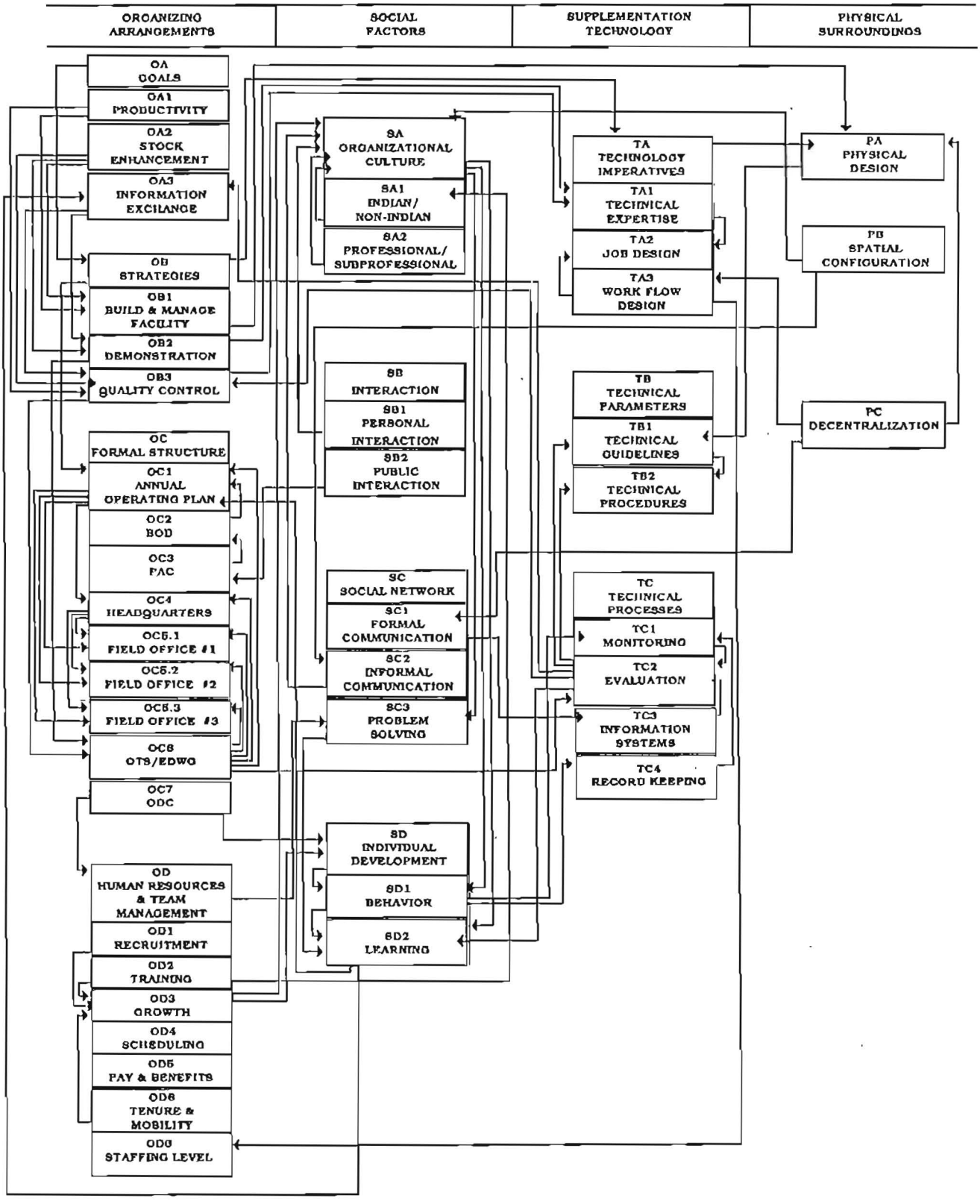
Contracting to a single operator other than one of the management agencies is the least desirable alternative from an organizational development standpoint. We believe that this alternative would quickly distance the management agencies from active participation in the project. Feeding back project results to influence management and policy making would be difficult. Implementing the concepts of adaptive management, participation in quality circles, team management, and ongoing organizational change would be difficult to administer by contract.

Contracting to a single operator has short-term appeal in terms of cost efficiency, but it would exacerbate the tension between agency interests and funding considerations. It possible that project management would degenerate into a political/economic conflict between agencies, each defending its discrete and parochial interests. This is so antithetical to the principle of adaptive management that it must be avoided at all costs.

Organizational Components of the YK Project.

Our detailed recommendations and the discussion of these recommendations are set forth in the context of the Stream Analysis Model. The reader should perceive each of the components as a data window and follow the discussion with occasional reference to the flow chart in Figure 9. This presentation is a most useful tool to the implementers of the YK Project. The advantage of this method of presentation is that it can be transferred to a computer model and finalized as a continuous organization planning and tracking system. It can be used to diagnose organizational problems as they arise. This model as we have designed it should provide the Project Manager and the Organization Development Committee the necessary tools to continue to make rational and cost effective choices in building the organization. The information presented below should be inserted into our computer program and updated as the organization moves forward.

Figure 9: Relationships Between Organizational Components.



OA - Goals.
Recommendations:

1. **Project purposes and goals must be clearly and frequently stated.**
2. **Establish consistency between internal and external statements of project goals.**
3. **Remove ambiguity concerning differences between supplementation and production.**
4. **Develop a project goal for economic and cultural benefit to the Yakima Indian Nation.**

Clearly stated and repeated project goals must drive the organization and the behavior of project personnel. Goals must be developed and understood at all levels of the organization, and must clearly express what the organization is trying to achieve. Individual decision makers must evaluate their activities in the context of achieving organizational goals. As the organization moves from *ad hoc* planning, to implementation to operation, there will be an increasing need to formulate goals distinct from those of the participating organizations and entities. This will require that project employees and participants understand major project goals in a way that promotes the desired organizational culture and promotes organizational loyalty and, most importantly, individual behavior.

Comments from personal interviews by some not closely identified with the project suggest a lack of understanding and commitment to project goals. Project goals are stated in general terms in the Preliminary Design Report of April 1990, which specifies that the purpose of the project is to "supplement and enhance natural production of salmon and steelhead... not to replace natural production.". This represents a full scale application of new technology..

External reporting of progress toward project goals should be consistent with the internal statement of goals and strategies. An annual public statement of project goals and progress toward achieving those goals should be arranged by the MEPG and the Public Affairs Officer.

Comments of the modified Delphi survey and in personal interviews revealed a high degree of interest in restoration of fish runs as a cultural asset of the Yakima Indian Nation, and in providing employment for tribal members. Although not specifically stated as a project purpose, there appears to be an understanding on the part of many participants that the project is worthwhile only if it results in making more fish available to YIN members and/or improves the YIN employment situation. These assumptions should be translated into a project goal, with a realistic implementation strategy that reflects the constraints of other organizing arrangements.

The Preliminary Design Report (PDR) implies recognition of the possibility that project goals will have to be changed, perhaps not qualitatively but quantitatively. Such change must be carefully monitored to ensure that the

original principles expressed by project goals are left intact, and not eroded incrementally. This will require the attention of the Policy Group and the Policy Advisory Committee.

See also the discussion of history and organizational culture and the discussion of project purposes in Appendix B, pp. 10 & 42.

OA2 - Stock Enhancement.
Recommendations:

1. **Establish and clearly set forth expectations about the degree to which supplementation will address issues such as genetic diversity, preservation of existing stocks, and genetic interaction.**
2. **Institute annual review of the expectations established in #1 above, with the purpose of continual internal and external clarification.**

As the project moves from implementation into operation, a more formal review of stock enhancement goals and progress will be required, to ensure that other organizational elements -- technology, administration, etc. -- are adjusted to reflect changes. Stock enhancement goals must be continuously articulated in terms of individual stocks and locations in order to form clearer expectations. Much preliminary work can be found in the Preliminary Design Report (PDR), Appendix A. The PDR also recognizes that stock enhancement goals could change as sub-basin planning recommendations are implemented and habitat improvement work associated with the project is completed.

Many participants are unclear where supplementation quits and production begins, in spite of production goals in the PDR. The adult production goals in Appendix A of the PDR, "indicate the expectations from a successful supplementation program," but it is unclear how falling short of expectations, and to what degree, would determine that supplementation was not successful. It would be beneficial to settle on a definition of supplementation, not with the idea that it would be the final word, but as a means of lending more precise meaning to initial project activity.

OA3 - Information Exchange.
Recommendations:

1. **Establish information exchange mechanisms which will reduce the uncertainty of supplementation and promote the cost-effective rebuilding of fish runs throughout the Columbia Basin by transferring scientific knowledge and adaptive management techniques.**
2. **Recognize that organizational learning is an essential element of adaptive management and that information exchange must be effective and timely.**
3. **Continue to emphasize experimental purpose of the project and the need to test full scale application of supplementation technology.**

"Information exchange" is a restatement of the "experimental goal" found in the Preliminary Design Report of April 1990, and reflects the preferences of project participants during group dynamics exercises. The concept of information exchange takes traditional concepts of experimental results at least one step further, as required by the adaptive management concept. According to the Preliminary Design Report, "One requirement for successful application of the adaptive management approach is an effective process of learning from experimentation..." and this includes "...development of a coordinated information and data sharing system as a vital part of this process."

The project organization must seek to publish its results in scientific and professional journals, report its activities and results to other agencies and entities in the Columbia Basin, engage in peer review of experimental results, encourage project professionals to attend seminars and conferences, and conduct other traditional information exchange activities. External communications to transmit scientific knowledge and adaptive management techniques must have a high priority, and this principle is recognized in the Preliminary Design Report.

Sending employees to other projects for training is a form of information exchange. Efforts should be made to establish external mobility so that project employees at the professional and subprofessional levels have opportunities to interact with their peers in similar and related projects. This may be expanded to include employee exchange programs with other states, or even with foreign governments. Administrative systems and scheduling and assignment procedures must provide the flexibility necessary to facilitate external mobility.

OB - Strategies.
Recommendations:

1. **Continue to develop clearly defined strategies which reflect project goals, building on the process used in experimental design.**
2. **Develop a strategy to show how production and supplementation are to be integrated and optimized.**

Strategies lay out pathways to achieve organizational goals. The choice of strategies in the adaptive management process is critical to project success. Project strategies must recognize change and learning as an integral part of goal achievement. Learning must be incorporated into all strategies for adaptive management to succeed.

Project participants gave different interpretations of how production and supplementation goals would be integrated and optimized.

OB1 - Build and Manage Facility.
Recommendations:

1. **Recognize that physical design and location will have significant impact on long term project success.**
2. **Maintain maximum flexibility in construction and operation of all facilities,**
3. **Conduct annual review of upcoming decisions concerning facilities construction, with the purpose of preserving future options and defining operating routines.**

Physical separation of facilities and internal arrangement of facilities will influence communications among project personnel and job design. Design and construction of facilities should proceed from a recognition of their influence on these and other organizational processes.

Flexibility of physical facilities must be designed in before construction. A standard hatchery design may not accommodate the range of experimental options necessary to carry out project strategies and preemptive purchase of a standardized facility design will diminish the project's chances of success. The only appropriate course in determining physical design is to establish facility requirements which conform to experimental and production activities. Since many of these are not yet determined, the appropriate alternative is to design facilities that can accommodate a wide variety of experimental and production activities. This may require "over-design" in terms of size, capacity, separation, etc. and higher initial costs associated with such over-design. Adequate initial design and construction, although more expensive than a standardized facility, is less costly than extensive modifications to a facility that proves inadequate. The Preliminary Design Report implies recognition of this principle of keeping certain design options open.

As additional physical facilities are planned and built, preliminary project results must be considered. Information gained during operation of the first project facility will be invaluable in designing the second and subsequent facilities. As the project progresses, adaptive management may indicate smaller, simpler and less costly facilities than were constructed in earlier stages of the project.

See also the discussion of appropriate technology in Appendix B, pp. 10.

OB2 - Demonstration.
Recommendations:

1. **Establish a clear and precise definition of supplementation, with the purpose of communicating the definition internally and externally.**
2. **Compare and contrast supplementation with traditional production and research efforts, with the purpose of integrating and optimizing supplementation, production and research.**
3. **Conduct annual review of #1 and #2 above, with the purpose of enhancing the definition and operation of supplementation.**

The project strategy of demonstrating supplementation needs clarification, some of which will have to develop as the project evolves, and some of which should be attempted immediately. Perhaps a "clear and precise" definition of supplementation will be possible only after several years of operation.

The basic strategy is to show whether or not supplementation is a viable fisheries management principle. Because the concept of adaptive management is considered necessary to supplementation, the demonstration strategy involves organizational design and management concepts which go well beyond the boundaries of traditional fisheries management. Demonstration includes determining what the term "supplementation" means. Part of such a definition will be to compare and contrast, by means of experimentation and statistical analysis, the results of conventional fish production efforts and YKPP activities. Another part of such a definition will be a reconciliation of production and experimentation, which should theoretically be indistinguishable under a supplementation regime. Finally, it will be demonstrated whether adaptive management and other alternative organizational concepts are appropriate to fisheries management.

Since the YKPP represents the first attempt to incorporate the concepts of supplementation and adaptive management on a large scale, the definition of supplementation and the technology and organization necessary to carry it out will be determined to a large extent by this project. The project therefore has a responsibility to share with the larger fisheries management community its progress in defining supplementation.

While other fisheries management projects include commitments to demonstrate supplementation, the YKPP remains the only project in which

demonstration is included as a comprehensive and necessary element of project design. The YKPP will present the only reliable demonstration of cost-effective, biological success.

OB3 - Quality Control.
Recommendations:

1. **Establish a quality control strategy which recognizes the need for a level of quality control equal to or higher than other first class research facilities.**
2. **Establish participatory quality control by integrating quality circles with all experimental and production processes.**
3. **Conduct annual review of project-wide quality control issues.**

Quality control is a key project strategy. Project participants stressed the need for exacting quality control, and mentioned the quality circle process as a means of achieving a high degree of quality control. Concern currently centers on technical outcomes in terms of survival, reproductive success and long term fitness. Establishing a project strategy will also reinforce the quality control imperatives which influence recruitment, training, organizational culture, and job design. Due to the decentralized and diverse nature of project activity, quality circles will work only in combination with team management and integration into technical processes and administrative procedures at all levels.

The project must adopt the philosophy of "bottom to top" quality control and team management, which uses statistical quality control and participatory management techniques to analyze virtually all processes at all levels of the organization. This is sometimes known as "company-wide quality control" and must be built into the organizational culture. It involves more than the usual technical efforts at quality control.

Review of quality control issues should be an ongoing responsibility of the Organizational Development Committee. Annually, the Organizational Development Committee should form a Quality Control Committee, made up of selected Organizational Development Committee members, representatives of subprofessional employees, and quality control authorities from other organizations. The goal of the annual review is to identify quality control issues which concern the organization as a whole and/or the entire fisheries management community.

OC - Formal Structure.
Recommendations:
1. **Keep the project organization small.**
2. **Promote flexibility and respond to the need for change.**
3. **To the maximum extent possible, contract for services and employment.**
4. **Maintain a zero-base budgeting process.**

The object of a small organization is to maintain flexibility by allowing the organization to change its structure by changing its internal and external relationships. The ability to phase out or scale down some activities, while phasing in or expanding others, is important as the project moves from implementation to operation. A small organization is better able to respond to the needs of adaptive management.

Contracting out and employing limited term agreements are recommended to keep the organization small and flexible. As the project organization gains in its ability to formulate and administer the Annual Operating Plan (AOP), it may be able to contract for many services.

OC1 - Annual Operating Plan.
Recommendations:
1. **Establish a formalized process to prepare, approve and administer an Annual Operating Plan (AOP).**
2. **Establish AOP administrative support in the Office of Administrative Services.**
3. **Include in the AOP a system of priorities and budget contingencies which address funding uncertainties.**

The AOP is a planning, implementation, process and budget document. Of all project documents, the AOP involves the widest variety of technical, administrative, legal, and budget considerations. It contains descriptions, specifications and costs associated with all project activity and contracts for a particular fiscal year. It coordinates annual activities with those of previous years and planned activities for coming years. The AOP includes implementation strategies for all activities and describes these in terms of their expected results, how much they will cost, who will accomplish them, how their success will be measured, and follow up activities such as reporting and accounting.

Project administration will have to deal with three AOPs at once. Project administrators and the funding agency will conduct accounting and auditing activities on the prior year's activities. The AOP approved in the previous fiscal year will be implemented during current project operation. Management personnel and the MEPG will formulate an AOP for the coming year. Long range planning will involve AOP considerations two or more years in the future.

As the project moves toward full operation, dealing with three or more AOPs will become a formidable task, requiring the use of organizational development tools for project management, scheduling, and work flow design. Administrative systems will have to be acquired and personnel trained in their use for organizational development.

An initial AOP is being developed for the coming year. It is important to begin effectively working within the context of an AOP structure immediately to allow a smooth transition to more comprehensive AOPs when an Operation and Management Agreement (OMA) is in place. The first AOP will be constructed largely from the Preliminary Design Report and its appendices, and this implies that the first AOP will follow from initial planning done in preliminary design. Subsequent AOPs should be written as planning documents in themselves, recognizing that project participants count on the AOP for a great deal of guidance and control. The potential AOP development process is suggested by the EDWG chart on page 28.

OC2 - Board of Directors (BOD).
Recommendations:

1. **Recognize that the management entities have made a great deal of progress in forming the present MEPG and building trust and communication.**
2. **Institutionalize the roles of representatives to the MEPG in a Board of Directors, so that YKPP activity remains a high priority within each participating agency.**
3. **Policy group decisions should follow a standard format, with formalized mechanisms for requesting information from appropriate internal or external sources, and for notifying appropriate project personnel and the public of decisions.**
4. **Implement adaptive management by institutionalizing a flow process so that the results of evaluation become the basis for BOD decision making.**
5. **Establish a formal, explicit boundary between management and funding areas of responsibility.**
6. **Produce an annual, public restatement of project goals and strategies.**

The role of the BOD in budget design, experimental design, and project operation is goal setting, strategy approval and resource allocation. The BOD approves the AOP, and ensures that proposals and work plans contained in the AOP conform to project goals. There is also a BOD oversight role to ensure that the various parts of the organization are integrated and working toward a common purpose.

Many respondents to the modified Delphi survey consider the current policy process somewhat mysterious, as might be expected in an *ad hoc* planning organization. As the project moves toward implementation, policy decisions will require a higher degree of involvement and investment by scientific and

technical project personnel. To achieve this, a routine, formalized policy process is necessary. See the discussion of policy clarity and definition in Appendix B, pp. 4, 6, 41.

Where the results of the evaluation process indicate significant changes in project activity, such changes will require concurrence, if not formal approval, by the BOD. It should be the function of OTS and EDWG to screen evaluation results, with the goal of determining which results recommend operational changes requiring BOD concurrence and/or approval.

The Chief Executive Officer (CEO) should continue to act as a liaison between the BOD and project personnel, with the objective of maintaining a high level of involvement and investment by ensuring timely and precise communication on policy matters. By promoting involvement and understanding among technical and scientific personnel, the CEO promotes policy decisions which have clearly articulated outcomes and promote a generalized understanding of project goals and objectives.

The BOD should review critical administrative and technical guidelines annually, with emphasis on ensuring that guidelines reflect changes in project purposes and strategies, including results of monitoring and evaluation, and resolving questions of "internal philosophy." An example of the latter is the issue of high versus low technology. (For a discussion of the appropriate technology issue, see Appendix B, pp. 10, 37.) Such issues need to be resolved by the BOD, but not on an irrevocable basis, since change may be appropriate as project strategies change.

Annual restatement of goals and strategies should be primarily a BOD product. The internal purpose is to ensure that project activity conforms to a coherent mission. The external purpose is to reinforce the public perception of the project as a benefit in terms of productivity, stock enhancement and information exchange.

OC3 - Policy Advisory Committee.
Recommendation:

1. **Appoint a Policy Advisory Committee of 8 to 10 key opinion leaders who represent significant interest groups.**

During the pre-design phase, some interest groups have not been regularly included in the fast-moving policy and technical pre-design activity. Their opportunity for input in a meaningful time frame can be addressed through the appointment of a high level policy advisory committee. This group would meet on a quarterly and on-call basis with the Board of Directors. To be effective, it must be staffed adequately and be provided any information the members require. The CEO must be available to its members and he should look to them for advice both individually and collectively on issues of implementation of the Annual Operating Plan.

OC4- Headquarters.
Recommendations:

1. **Establish the position of Chief Executive Officer (CEO).**
2. **Establish three principal organizational groups: Office of Technical Services, Office of Field Operations, and Office of Administrative Services.**
3. **The Office of Technical Services should include all professional/scientific personnel. Its function should be to perform evaluation and support field office functions which require expertise in research, genetics, biology, etc. Such support should be provided by assigning a Technical Services Advisor to each field office for assistance in routine biological and scientific tasks, as well as providing on-call, centralized support for more specialized tasks.**
4. **The Office of Field Operations should include field office managers and personnel involved in fish production, adult and juvenile collection, data gathering and similar activities.**
5. **The Office of Field Operations should be temporary. It is an additional layer of hierarchy which should be eliminated as the organization eventually integrates all field offices into a "production circle."**
6. **The Office of Administrative Services should include personnel involved in, either directly or by contracting out, functions such as quality circle advising, team building, personnel services and payroll, employee development and human resources, administration of grants and contracts, writing and publications, public relations, janitorial services and physical facilities maintenance, and centralized data management.**
7. **Establish administrative policies which define flow of information and authority from headquarters to field offices.**

The evolution of the organization is represented by the sequence of Figures 3A, 3B, 3C and 3D above. Our recommendations assume a deliberate evolutionary plan, to move from an *ad hoc* planning organization, to a more integrated implementing organization, and finally to a fully integrated operating organization. Initially, the organization would exhibit traditional layers of hierarchy and top-down management. Evolution would be accomplished by eliminating levels of hierarchy and using team management to encourage a more horizontal flow of decision making and problem solving.

The Chief Executive Officer (CEO) should be selected primarily according to administrative and leadership abilities, with secondary consideration given to specific familiarity with fisheries programs. Further discussion of selecting a CEO is included in the summary of group dynamics exercises, Appendix C.

The Office of Technical Services houses most of the scientific professionals involved in the project. The functions of this office are currently carried out by EDWG members, and scientific and production professionals from the

management and funding agencies. Employees should be chosen with primary consideration given to demonstrated ability to function in an applied research environment where experimental activities are coordinated with production processes. The director of this office would chair EDWG.

The Office of Field Operations is temporary. It will establish and manage field offices during project development steps. When field office personnel are adequately trained and experienced in team management, the Office of Field Operations will no longer be necessary to accomplish the mission of the agency.

The Office of Administrative Services will provide staff support such as human resources and contract management.

OC5 - Field Offices.
Recommendations:

1. **Establish field office jurisdiction according to geographic areas of fisheries management responsibility and organize team management around field offices, rather than according to technical specialties.**
2. **For each field office, establish a position of Technical Services Advisor, and assign to this position the responsibility of advising a field office concerning experimental procedure and other scientific considerations. Also assign to this position the responsibility to coordinate with the Office of Technical Services for specialized services such as genetics, histology and data analysis.**

Geographic separation of facilities prevents organizing a single, centralized staff because a great deal of travel would be required to move personnel with appropriate technical skills from a central facility to the location of a particular task. On the other hand, a very decentralized staff would require collecting scattered individuals with appropriate technical skills into teams and scheduling them to converge on a specific location. Either extreme should be avoided, and this can best be accomplished by centralizing at the field office level.

Initially, each field office will have a manager who will report to the Office of Field Operations. Establishing team management will eliminate the Office of Field Operations, thus removing a layer of bureaucratic hierarchy between the field offices and the rest of the organization.

A moderately decentralized organization requires a uniformly higher level of technical expertise than might be found among employees of a centralized organization. This is reflected in recommendations concerning staffing level, training, job design, and work flow design.

The relationship of each field office Manager to the Technical Services Advisor (TSA) assigned to that field station should be carefully described to promote a cooperative interaction between field operations and technical services. It is within the authority of a field office manager to supervise all activities at a field station, but it is also the responsibility of the director or manager to coordinate with the TSA to ensure that all activities are carried out according to experimental design specifications. It is the responsibility of the TSA to review ongoing and upcoming field office activities, and to assist the field office in assessing the relationship of each activity to experimental design.

OC6 - Experimental Design Work Group (EDWG).
Recommendations:

1. **During pre-design and early implementation, maintain current EDWG function of providing recommendations on basic scientific direction and methodology to establish supplementation.**
2. **Focus EDWG efforts on completing pre-design, design and implementation of monitoring and evaluation procedures.**
3. **Assign EDWG a key role in the design and review of systems and procedures which affect the monitoring and evaluation processes.**
4. **Prior to FY 1993, eliminate EDWG responsibility for specific projects and contracts by transferring technical project management and contract supervision to the Director of Technical Services**
5. **Assign EDWG to advise the Chief Executive Officer and Board of Directors on policy recommendations that result from the evaluation process.**
6. **Assign EDWG to facilitate peer review and other pre-publication review of project results intended for outside dissemination.**

Figure 10, an EDWG work flow chart for formulating an experimental design plan and annual work plan, follows the discussion.

During project pre-design, EDWG has provided the basic strategy for fundamental project activity, which is developing and implementing a demonstration of supplementation through an integration of scientific experimentation and hatchery production. EDWG has completed an experimental design for the Yakima Basin, and will complete one for the Klickitat Basin.

EDWG currently functions primarily through its ties to the Project Leader. We expect this relationship to gradually diminish, with EDWG establishing closer ties to the Office of Technical Services (OTS). EDWG members have expressed the need for technical guidelines and procedures to respond directly to the evaluation process without requiring a formal management decision for every change in procedure.

As overall project administration assumes more general coordination, EDWG should concentrate on biological aspects of the project and coordination between biological and other project-related activities. Progress toward the EDWG role described in the Preliminary Design Report should be phased in by institutionalizing the roles of EDWG members as members of the project, rather than members of other agencies. Comments by project participants reveal that EDWG members have done an excellent job of crossing interorganizational boundaries and acting on behalf of the project.

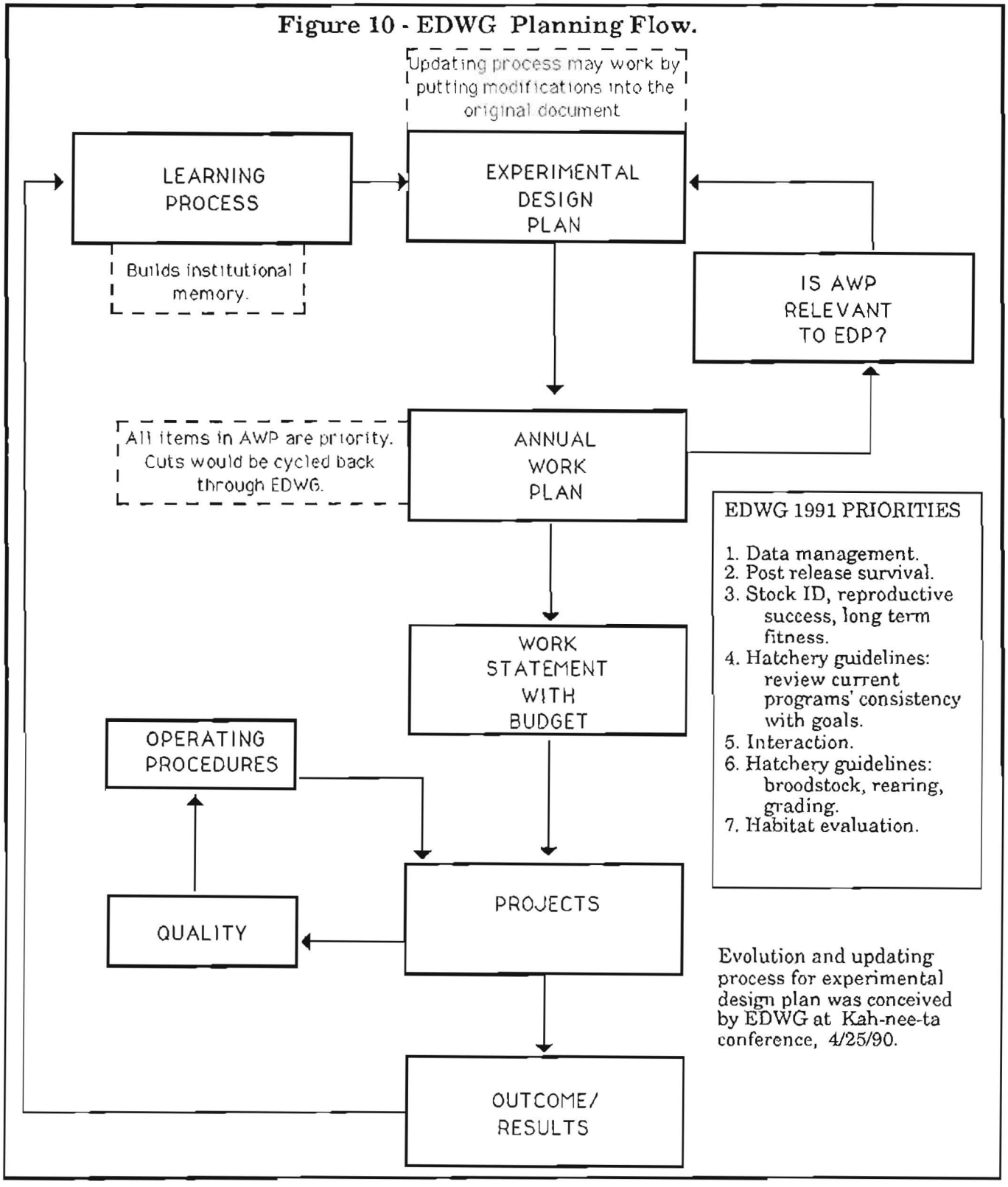
During project implementation, EDWG will ensure that scientific and experimental concepts are included in many processes and systems. It will be the job of EDWG to "put science into" recruitment, training, job design, technical guidelines and procedures, record keeping, information systems, facilities design, and monitoring and evaluation procedures. This will be accomplished by EDWG's leadership in designing monitoring and evaluation systems and procedures.

Monitoring and evaluation are particularly important in the YKPP. Both processes are critical in determining the success of project activity by measuring survival, reproductive success, long term fitness and interaction. Results are also used to recommend ongoing modifications in field office activity. Because most project activity depends on continuous comparison to scientific criteria, the role of EDWG in establishing and maintaining these criteria is particularly strong during project implementation, and will continue to be significant in the foreseeable future.

The evaluation process is largely a function of statistical analysis of biological data. As such, its interpretation is appropriately done by scientific professionals in the Office of Technical Services, some of whom will fulfill these responsibilities as members of EDWG. Due to the composition of EDWG and the nature of professional and scientific expertise held by its members, it is the appropriate body to advise the CEO and BOD on changes in project policies dealing with experimental design.

See also the discussion of role and importance of EDWG in Appendix B, pp. 38 and in Appendix C.

Figure 10 - EDWG Planning Flow.



OC7 - Organizational Development Committee (ODC).
Recommendations:

1. **Form an ODC, with members appointed by the Project Manager.**
2. **The ODC should guide development of organizational design for personnel administration, public interaction, technical guidelines and procedures, job and work flow design, monitoring and evaluation, and other technical and administrative processes.**

ODC membership should be diverse and oriented toward organizational change. The Project Manager should seek ODC members who will appreciate the "bottom to top" philosophy of adaptive management and will legitimize organizational changes by integrating innovation and participation from all levels of the project.

The ODC is a working group aimed at implementing organizational design. It pays particular attention to organizational arrangements concerning human resources, growth, organizational learning, and employee participation.

OD1 - Recruitment.
Recommendations:

1. **Recruit project personnel with particular attention to personnel who demonstrate the ability to work in an environment of change rather than one of security.**
2. **Assign the function of recruiting to an organizational specialist familiar with requirements of participatory organizations.**
3. **Recruit employees who will benefit and grow in a changing organization.**

The project must maximize full-time, year-long employment. Employees will have to be motivated individuals who are capable of a high degree of self-supervision. These characteristics are not found among subprofessional employees in the traditional, hierarchical organization.

Recruiting for an adaptive management organization requires the ability to perform highly subjective evaluations. Employees should be sought who will "fit in" with the organization and work well in a system of participatory management. Recruiting for an adaptive management organization is a complicated task, but a necessary one, and recruitment should be carefully supervised by a qualified specialist, with the support of both scientific and technical experts in the project.

A changing organization requires that employees adapt to new situations by gaining new skills and moving across jobs. While this is upsetting and unsettling to many people, others flourish in such an environment. The project will benefit greatly by seeking employees who demonstrate versatility

and adaptability, a capacity for self-motivation, and a desire to accept new challenges.

Traditionally, recruiting is conducted according to experience and education, with the prediction that the employee will meet traditional evaluation standards if certain educational and experiential elements are present. There is the expectation that the employee meet certain "demands" of the employer, and the ability to meet such demands is predicted by past ability to meet similar demands. This views the individual as isolated from the environment and has little to do with concepts critical to team building -- cooperation, contribution to group morale, loyalty to the organization, etc.

OD2 - Training.
Recommendations:

1. **Provide maximum opportunity for project personnel to train in a variety of skills and disciplines.**
2. **Emphasize training opportunities for members of the Yakima Indian Nation.**

The object of training is to promote learning by challenging employees to acquire new skills and knowledge that allow them to adapt to changing needs. A learning organization depends on promoting personal growth to move people across jobs and jobs across people. Training in group interaction and participatory skills is essential to an adaptive management organization.

There is a diversity of opinion concerning the amount and type of training which should be provided to project personnel. (See Appendix B.) Objections to a high degree of training and education are based on cost and some sentiment, not clearly articulated, that providing training at project expense constitutes "giving something for nothing." The unusual requirements of this project makes these objections less compelling than they might be in a traditional organization.

By emphasizing training for members of the Yakima Indian Nation, some of the Indian/non-Indian distinctions will be minimized and the participation of the YIN will be strengthened as a management agency. This will also help support expectations of cultural and social benefits for tribal members.

For a further discussion of training, see Appendix B.

OD3 - Growth.
Recommendations:

1. **Encourage participatory management, quality circle, and team management activities.**
2. **Establish personnel administrative procedures which support employee growth.**

Employee growth is a human resources management concept which includes elements of recruitment, training, tenure, and mobility. By providing a nontraditional system of personnel administration, employees come to regard the project as more than just their employer. As the project makes investments in employee growth, it will see returns in terms of employee behavior, which drives organizational performance.

It is recommended that project employees be recruited and evaluated in a nontraditional manner, according to their team participation and personal growth within the project. Quality circles and participatory management are essential and employees should be chosen for their team potential and evaluated and promoted for their growth in these areas.

OD5 - Scheduling.
Recommendations:

1. **Schedule and assign project personnel to promote cohesiveness in teams and quality circles.**
2. **Schedule and assign project personnel to take advantage of opportunities for training and education.**
3. **Assign personnel to other projects during slack periods, particularly when there are training and/or information exchange benefits.**

Team building, quality circles and other participatory management techniques are important elements of the project due to the consecutive nature of activities. The accepted standard for quality circle participation is one hour per week, and scheduling should reflect this. Team building exercises, group seminars, etc., do not occur as frequently, but do require scheduling accommodation.

Major off-job training and education of individuals is expected, and this requires adjusting the work schedule to allow participation. To promote team building, assignment of work should usually be done so that all members of a team are free to participate in training at the same time.

During slack periods, employees would be scheduled for training and education, or "leased" to other projects. Participation in non-YKPP projects and activities should be particularly encouraged when there are opportunities to diversify technical skills and promote information exchange. This promotes the concept of mobility.

OD6 - Pay and Benefits.
Recommendations:

1. **Offer project employees pay and benefits commensurate with the level of responsibility expected by job design.**
2. **Pay and benefits should be equalized with those of WDF and WDW, to promote inter-agency participation and mobility.**

Discussions with project participants reveal that employees are expected to be highly motivated, self-supervising, willing to participate in training, and otherwise above average. Employees are expected to cope with complex and fluctuating work flow design, scheduling, and assignment situations.

One way to acknowledge meeting such high standards is to offer competitive wages and benefits. This may not be possible, due to administrative constraints of the participating agencies. In lieu of generous pay and benefits, attention should be paid to minimizing the professional/subprofessional distinction and offering other opportunities.

Training and learning efforts will require exchanging personnel between the project and participating agencies, and between the project and other resource management agencies. If pay and benefits for a particular position in the project are different than in other agencies, there will be negative consequences in terms of behavior, and employees will find incentive to leave the project.

OD7 - Tenure and Mobility.
Recommendations:

1. **To the maximum extent possible, offer job security through full time, year-long employment for all project employees.**
2. **Employ limited term agreements to promote flexibility.**
3. **Establish mobility among participating agencies.**

The threats to organizational stability posed by a temporary, transient workforce are numerous in a project which demands a high level of technical expertise and individual commitment and flexibility.

Limited term agreements for employment and contracted services should be utilized to allow changing staff composition as the needs of the project change. The term for such agreements should balance the need of the project to remain flexible with the need of employees for employment security. Employees who demonstrate growth should be offered new agreements. Permanent tenure is not advised for this organization.

Mobility refers to the ability of an employee to move from the project organization to one of the participating agencies and back again. In effect, an employee could advance on two "career ladders" at once -- within the YKPP and WDF or WDW.

OD8 - Staffing Level.
Recommendations:

1. **Establish a staffing level adequate to serve multiple facilities and decentralized organization.**
2. **Allow for changing staffing level.**

Multiple project facilities arranged in a physically and organizationally decentralized manner demand a larger staff than a highly centralized organization. Each facility must have a staff adequate to form a cohesive team, and this implies a full complement of full time, year-long employees at each facility. There must also be a large enough staff to allow temporarily moving personnel from one field office to another, to clear occasional logjams.

In implementation phases, it will prove impossible to assign personnel to permanent positions. There will be significant demands to move employees across a variety of jobs during implementation, and this may also involve asking employees to relocate as work flow design changes during project evolution. One solution is to hire a large staff, with the intention of providing internal mobility so that employees eventually find niches in the project. Another alternative is to hire the majority of employees on limited term agreements, with the intention of replacing them as staff requirements change. In the case of the second alternative, employees should be offered training and other opportunities that provide them with external mobility necessary to find other employment.

SA - Organizational culture:
Recommendations:

1. **Develop the permanent shape of YKPP organizational culture as distinct from that of the participating entities.**
2. **Recognize, respect, and reconcile variations among organizational cultures of the participating entities and individuals.**
3. **Begin a project history which records processes and achievements in a manner consistent with the desired organizational culture.**
4. **Establish the "cultural story" of the YKPP by repeating and reinforcing project purposes, goals, and strategies.**

Each participating agency has its own employees, administrative systems and values. Each agency has a different approach to resource management in general, and to the YKPP in particular. The culture of any organization consists of the basic values and assumptions which underlie official statements of policy and procedure. Because it is assumed, organizational culture is usually a more powerful force than more visible official policies. In almost any organization, "The way we do things here," is more accurately reflected in coffee breaks than in the board room.

Organizational culture is sometimes confused with the Indian/non-Indian cultural distinction. While there is a connection, organizational culture is different from social and ethnic culture. The YKPP organizational culture

must form its own culture by reconciling differences in the cultures of participating agencies, Indian/non-Indian differences, and professional/subprofessional differences. This is not a question of ignoring the cultural orientation of participants, or pretending that other cultural differences aren't important, but of convincing individuals involved in the project to subscribe to a YKPP organizational culture distinct from their previous personal and professional cultural associations.

The participating agencies (BPA, YIN, WDW & WDF) have technical/professional organizational cultures. In the case of WDW or WDF, organizational culture has been established for many years, long before the memories of current individual employees. In the case of the YIN, technical/professional employees have been hired within the past several years, but have quickly formed an organizational culture, at least in the Fisheries Program, similar to that of WDW or WDF, but different from that of the parent organization. BPA's history involves a variety of technical endeavors, and it is the largest of the participating agencies, but BPA is relatively new to biological programs, which do not always blend in perfectly with the dominant engineering culture. Although the YIN has managed fisheries for 6000 years, the organizational cultures of BPA and YIN are similar because, in technical fisheries management, both could be considered "emerging."

To promote project purposes and establish the desired organizational culture , it is necessary to keep an accurate organizational history, not only in terms of what was done, but why it was done a particular way. Development of project history can be manipulated somewhat to reinforce awareness of project goals and strategies as well as other organizing and technology arrangements. It is particularly important to pay attention to project history during implementation phases, with the purpose of describing and recording an early project history that shows the YKPP establishing itself as distinct from the participating agencies.

While technology imperatives of each organization determine organizing arrangements, a more important factor is the organizational "story" or "myth." The organizational story consists mostly of what is not written down, tacit understandings, basic assumptions that are seldom articulated and not usually questioned. Because the organizational story is assumed, it is a more powerful motivating force than written explanations of project goals and strategies. Because the YKPP organization is new, its organizational story has just begun.

The central focus of the YKPP organizational story should be project goals and strategies. Each of the participating entities may contribute additional elements: cost effectiveness from BPA, the historical and cultural significance of the resource from the YIN, traditions of fish culture from WDF and WDW.

Each agency has specific motives for participating in the YKPP. Individuals often ascribe generous motives to their own organizations, and express uncertainty about the motives of other organizations. Incentive for inter-organizational cooperation is higher when members of each organization understand their own motives for participation, and how these interact with the motives of others. This allows individuals to buy into the YKPP organizational culture because they understand that it reconciles and respects the cultures of participating individuals and entities.

There must be a recognition that cultural differences do not mean that one group of participants cares less about the fisheries resources, nor does it mean that disagreement indicates cultural conflict.

SA1 - Indian/non-Indian Culture.
Recommendations:

1. **Minimize the impact of Indian/non-Indian cultural differences by articulating specific motives for agency participation and inter-agency cooperation.**
2. **Minimize the impact of Indian/non-Indian cultural differences by breaking down the parallel between Indian employment and subprofessional employment.**

The distinction between Indian and non-Indian cultures is a source of some antagonism, perhaps because it has been blown out of proportion, and because some organizational and administrative incompatibilities have been incorrectly laid off on Indian/non-Indian cultural differences.

It is important that the Yakima Indian Nation articulate its social and historical connection with the fisheries resource, and explain how this motivates them to participate in the project, and how it creates certain expectations within the Indian community. Each of the agencies should explain its technical/professional motivation and the expectations created by agency history, financial pressure, constituency concerns, interest groups, etc. This will reveal that Indians and non-Indians alike are committed to enhancing the fisheries resource, and cultural differences merely create varying expressions of that commitment.

There has been a pattern of employing tribal members mostly as subprofessionals, particularly where professional positions require a high degree of scientific expertise. Part of minimizing Indian/non-Indian cultural differences in the YKPP will involve YIN members moving into professional positions. Further discussion follows in SA2.

SA2 - Professional/Subprofessional Culture.
Recommendations:

1. **Create job designs which emphasize acquisition of skills at all organizational levels.**
2. **Provide year-long employment.**
3. **Offering training and mobility so that subprofessionals have opportunities to advance.**
4. **Create advancement opportunities for YIN members to move into professional positions.**

Professionals are those individuals who hold positions and fulfill responsibilities usually associated with four year (or greater) degree programs in science, business, accounting, administration, etc. Subprofessionals are those individuals who hold positions associated with two year degrees, technical school programs, on-the-job-training (OJT) regimes, etc.

In many organizations, there are significant gaps between professionals and subprofessionals in terms of pay and benefits, opportunity for advancement, internal and external mobility and personal factors such as morale, behavior and loyalty . Participatory management concepts assume that steps will be taken to narrow these gaps in an effort toward team building.

There has been significant discussion concerning the need to imbue subprofessional project personnel with technical expertise such as computer literacy to improve the accuracy of record keeping and other ingredients of monitoring. This will require that subprofessional employees be presented with regular and frequent opportunities for OJT, as well as supplemental education outside the project. Training, both internal and external to the project, should be worked into job design and scheduling, and considered as an integral part of each subprofessional job.

Employees at all levels, but particularly subprofessionals, should be rewarded for showing initiative in seeking and completing training and education programs. This must be reflected in job descriptions and administrative systems as they pertain to employee evaluation and advancement opportunities.

Mobility inside and outside the organization must also be regarded in a non-traditional manner when evaluating employee achievement. Employees should be rewarded for changing jobs or even leaving the organization temporarily when the result is a significant improvement in education and skill level that will benefit the project. Loyalty to the organization should not be judged so much by length of service, but according to personal growth efforts that make the individual a more capable team member.

Currently, positions for biological professionals are dominated by non-Indians, leaving subprofessional positions as the only place for YIN members.

This creates a parallel between the Indian/non-Indian and professional/subprofessional distinctions, and reinforces cultural barriers between Indian and non-Indian employees. Success in placing YIN members in professional positions will help in crossing the Indian/non-Indian cultural boundary and, less obviously, will break down the professional/subprofessional barrier.

SB1 - Personal Interaction.
Recommendations:

1. **Encourage employees to develop personal interaction skills which support the team concept.**
2. **Present opportunities for training in group dynamics, interpersonal communication, consensus building and other personal interaction skills which support a participatory organization.**

Because work flow design uses the team concept to move people across jobs and jobs across people, employees need to be cooperative and flexible, willing to adapt to new assignments and work with new people. Employees must communicate and interact with each other to quickly form good working associations. Teams must be open rather than insular, and must integrate new members quickly. Good team structure is a function of both the personal interaction skills of each individual and the group interaction skills of the team as a whole.

Quality circles and other participatory exercises require training and practice in group dynamics. The Office of Administrative Services should provide some formal training which supports group activities.

SB2 - Public Interaction.
Recommendations:

1. **Formalize public interaction by establishing a regular schedule of meetings between project personnel and interested publics.**
2. **Establish the position of Public Affairs Director in the Office of Administrative Services and assign to this position responsibility for public interaction.**
3. **Publish and distribute a project newsletter.**
4. **Produce an annual, public restatement of project goals and strategies as a coordinated effort of the Policy Group and the Public Affairs Director.**

Public interaction is identified as one of the project restated goals. The need for a consistent, predictable pattern of public interaction appears self-evident. The above recommendations merely institutionalize and formalize features of the project already in place in the pre-design phase. Identification of interested publics is already underway and should continue.

The Office of Chief Executive Officer would provide staff support to the Policy Advisory Committee.

Membership should be flexible and meetings infrequent. Most public interaction will occur as project personnel meet with smaller public constituencies concerning specific project activities. The PAC would normally meet annually to provide input during Policy Group review of overall project operation.

A specific duty of the Public Affairs Officer should be to coordinate with the MEPG to produce an annual, public restatement of project goals and strategies.

SC1 - Formal Communications.
Recommendations:

1. **Identify communications needs associated with policy, technical, and funding aspects of decision making.**
2. **Establish a standard procedure to identify individuals and entities which are directly involved, concerned, or interested in decisions.**
3. **Initiate communications by means of a written request for information and participation to individuals and entities directly involved. Notify interested individuals and entities that a request for information has been made.**
4. **Utilize informal communications to explain the need for timely information sharing to enhance participation in formal communications.**
5. **Continue to encourage use of a computerized bulletin board.**

Certain informal communications need to be supplanted by formal communications to create certainty about issues, definitions, terms and opinions. Specifically, communications that involve policy, technical, or budget determinations should be in writing.

The communication process needs to be formalized so that the process is predictable. Information should be in a standard format and sent along established pathways. This may involve instituting very ordinary procedures, such as stamping a route and check-off box on memos to ensure that they are read and passed on.

Communications with those directly involved in the project need to be formalized in a way that causes all project personnel to stay informed of any project activities that affect them. A frequent complaint of those involved in the project is that they are left to determine for themselves what information to seek and how to apply it to issues and questions concerning the project. A possible solution is to identify one individual who is responsible for reviewing information as it comes into the project and as it moves around inside the project, with the sole purpose of determining who should receive which

information. Given the complexity of the project, this may prove to be a full-time job for one or more people.

Communications with entities not directly involved in the project should be formalized in a way that provides incentive for these "outsiders" to inform themselves about project activities. When the interest and participation of specific individuals and entities is desired, they must be made aware that a decision is pending, and that a request for information has been issued. The content and timing of such notification may vary, depending on the nature and extent of participation desired. In the case of significant policy decisions, formal participation by various interested publics will help clarify their desires and expectations, thereby creating greater certainty about the relationship of the project to the external environment.

Trust and cooperation are enhanced when project participants exchange accurate and timely information with their colleagues by freely sharing written information within the organization. This involves regularly sending memos and using the computerized bulletin board.

SC2 - Informal communications.
Recommendations:

1. **Place less reliance in informal communications by establishing more reliable formal communications.**
2. **Provide informal communication alternatives that enhance formal communications and participatory management.**

Many project communications have been informal to a degree that would not be found in an established organization. This may be due to the fact that reliable formal communications are not yet developed. The result is that details are omitted or embellished, causing inaccurate information to circulate among project personnel.

Policy and decision-making processes work largely by word of mouth and informal head counting. Written communications are the exception and there are no established procedures to determine who should be consulted on any particular issue. Fortunately, the project organization has remained small, and has managed reasonably well with informal communication. As workload, staff size, and task complexity all increase, informal communications will prove inadequate.

This does not mean that informal communication should be squelched. Quality circles are an example of the sort of communications that straddle the boundary between informal and formal. Participation is voluntary and there is no hierarchy or chain of command within the quality circle, so there is an element of informality. However, quality circles meet on schedule and the results are incorporated into the organizational process in a formalized way. Informality is encouraged in identifying problems and proposing solutions, to keep a low risk atmosphere and encourage participation. Formal

procedures are used in dealing with quality circle output, to ensure that policies and procedures actually respond to the need for change. Thus, informal communications can be used to reinforce formal communications.

SC3 - Problem-Solving.
Recommendations:

1. **Institute a formal problem-solving procedure which employs a specific management tool, and includes elements of problem identification, diagnosis, solution, planning, and tracking.**

As the project moves from an *ad hoc* organization to an implementing organization, some method of managing organizational change and development will be necessary. During group dynamics exercises, participants displayed some confusion when asked to work through a problem identification process. There is a natural tendency in an *ad hoc* organization to mask problems and deal with symptoms instead. The goal is to quickly and accurately identify problems, and implement appropriate solutions.

The concept of adaptive management suggests that problem-solving should be an ongoing activity, with a continuous flow of problem analysis and solution into project administration. There should be specific, institutionalized problem-solving procedures compatible with concepts of participatory management and team building.

During group dynamics exercises, we introduced the stream analysis method of organizational change management. For further explanation, please refer to the listing for Jerry I. Porras in Appendix D.

TA - Technology Imperatives.
Recommendations:

1. **Identify aspects of the organization that must be structured a particular way because of specific technological processes.**

Technology imperatives are the reality of project strategies. Because the YKPP is the first large scale supplementation effort, technology drives the operation of the project. Experimental design imposes specific requirements for fish culture, quality control, and biological procedures, and these requirements necessitate innovative organization and administration. In other words, form follows function and the function of the YKPP is basically technical.

TA1 - Technical Expertise.
Recommendations:

1. **Establish an initial level of technical expertise equal to or greater than the sum of the parts.**
2. **Generalize technical expertise to promote interaction between disciplines and specialties.**

Supplementation technology is an integration of the previously existing technologies of fish culture, hatchery production, biological experimentation, and monitoring and evaluation.

To legitimize results, the project will have to demonstrate that personnel involved in carrying out the demonstration strategy possess technical expertise adequate to support the integrity and credibility of each step. Demonstration of supplementation involves a rather complicated sequence of integrated procedures involving fish culture, biological experimentation, data gathering, record keeping, data analysis, monitoring and evaluation, and management decisions.

Due to the complex way different scientific and technical specialties sequence and merge, a high level of technical expertise should be generalized, so that many professional and subprofessional employees can accomplish tasks outside their specialties. This will require broader training and job design to allow employees to generalize their knowledge and skills, and overlap with other specialties.

Intensified education or experience in a particular specialty does nothing to generalize technical expertise. The emphasis should be on crossing boundaries between disciplines, particularly those boundaries traditionally established between production and experimentation.

TA2 - Job Design.
Recommendations:

1. **Establish job design which reflects the unique nature of the project.**
2. **Design jobs to allow moving people across jobs and jobs across people.**
3. **Design jobs to function with a high level of self-supervision.**

The YKPP is an attempt to integrate research and production, professional and subprofessional employees in a large scale demonstration of supplementation. As such, it is unique. Conventional job descriptions, which typically concentrate on specialized tasks and ignore considerations of integration and generalization, will fail. YKPP job design must emphasize generalized technical expertise, flexibility, cooperation, adaptability, interaction, and growth.

In order to make efficient use of employees with a variety of technical skills, it will be necessary to move people across jobs. This may involve transferring people to different locations temporarily, depending on the sequence of tasks and the order in which they become necessary at geographically separated locations. Ideally, there will always be personnel available to accomplish a particular task, no matter how it sequences with other tasks, and regardless of how far removed it might be from a central location.

There will be no "unskilled" workers in the YKPP, since decentralized activity and geographic dispersion make it unlikely that unskilled workers could be isolated from tasks requiring skills. This is particularly true if computerized field data collection is employed, so that a technical skill which is centralized in many organizations becomes generalized at all levels. Entry level employees will be expected to have or quickly acquire specialized skills normally associated with professional level personnel. Job design must reflect this reality by placing appropriate emphasis on requirements for general technical expertise.

In addition to skill requirements, project employees will have to be adaptable, willing and able to quickly "shift gears" in terms of what they do and with whom they work. This will require workers who are motivated, enthusiastic, loyal, and reliable. The ability to supervise one's own activities will prove important in management over a large geographic space.

The alternative is to resort to the more conventional method of hiring, training and then seasonally laying off subprofessionals and perhaps some professionals. While this practice may appear to have lower up-front costs, it would prove counter-productive in terms of morale. There would be serious long-term consequences in terms of an inability to retain qualified personnel. Scheduling would become nearly impossible. Unless project employees anticipate some opportunity for job security, advancement, and training, they will move to other organizations, leading to a high turnover rate and a lack of skilled employees in mid-level supervisory positions.

Conventional job design is not as "productive" as it appears, even in the short term. Because specialized skills are invested in particular employees, a job may have to be postponed if those employees are occupied elsewhere. In consecutive activities such as those in the YKPP, this is likely to cause bottlenecks and logjams, where several jobs have to be postponed because a critical evolution cannot be performed due to unavailability of specialized personnel. In the worst case, a logjam might be cleared by assigning an unqualified employee to perform the crucial task. The appropriate solution is to equip employees with the ability to perform several different jobs.

TA3 - Work flow design.
Recommendations:

1. **Construct a work flow model centered on field offices and use the results to improve work flow design and related organizational factors.**
2. **Assign responsibility for work flow design to an organizational development position in the Office of Administrative Services.**

Work flow design is the manner in which one task or job leads into another -- the sequencing and integration of tasks and technical specialties. In the YKPP, there must be coordination between experimental procedures and fish production. Work may flow back and forth between professionals and subprofessionals, or between researchers and production personnel, or between teams composed of people with a variety of specialized skills.

Work flow is a translation of strategies and technical elements into an operational process. Work flow design applies elements of technical guidelines and procedures and considerations of technical expertise available to accomplish a task or sequence of tasks. The path of a task across a variety of people, skills and facilities is work flow. In the project, there will be many such paths, some merging with others, some crossing, and some splitting off. Developing a visual work flow model will be useful.

There is a strong correlation between job design and work flow design. The latter addresses some of the challenges presented by the decentralization and geographic separation involved in the YKPP.

A single team of project workers cannot be organized around and dispatched from a single, central location because the nature and sequence of specific tasks will be different at each field office. Organizing a team around each field office would allow customizing the mix of personnel, training, skills, etc. Organizing around field offices also presents a manageable number of teams to coordinate under the overall project umbrella, so that the project organization is not too decentralized. The teams would bear enough similarity to each other, in their mixture of job design and work flow design, that personnel from one team could be temporarily moved to another team. This provides the flexibility necessary to do what we have termed, "moving people across jobs and jobs across people."

The tools chosen to build the teams should be similar, even though specific activities may vary. Frequency of participation in quality circles, team building, and training opportunities should be held at approximately equal levels for all teams, even though one team might be more advanced than another in its development. The way in which information is gathered and flows from a team to the central organization should be uniform. To encourage some overall standardization, there should be regular, formalized opportunities for teams to interact and exchange information.

TB1 - Technical guidelines.
Recommendations:

1. **Ensure consistency with project goals and strategies through regular, periodic review of technical guidelines by EDWG and the BOD.**
2. **Utilize flexibility of physical design by ensuring that technical guidelines reflect appropriate technology.**

Technical guidelines are different from technical procedures in that guidelines are generalized expressions of strategies and technology imperatives, while technical procedures are explicit instructions formed within those parameters. Technical guidelines are a translation of policy requirements, goals, and strategies. They establish the boundaries within which technical management personnel may operate.

As technical procedures are modified to accommodate changing needs, they should be checked for conformity to technical guidelines. Technical guidelines may have to be expanded to allow greater management latitude.

Technical guidelines should demand only those technical procedures which can realistically be accommodated, given restrictions imposed by physical design of the facilities. For example, guidelines calling for maximum utilization of automated procedures in a facility designed for manual operation are not realistic. Flexibility of physical design dictates, to a certain extent, the degree of latitude in technical guidelines. Discussion of appropriate technology may be found in Appendix B, pp. 10 & 37.

TB2 - Technical procedures.
Recommendations:

1. **Build in periodic review of technical procedures by EDWG and integrate the review process with other adaptive management concepts, such as quality circles.**
2. **Use results of quality circles and the evaluation process to implement continuous modification of technical procedures.**

Technical procedures are step-by-step instructions to accomplish a particular evolution or task or sequence of tasks. As such, they are more specific and more detailed than technical guidelines. Because technological details are likely to change, technical procedures should be subject to change.

In addition, there should be a mechanism through which other organizational development tools call attention to a need for immediate change in technical procedures that might occur prior to annual review. Changes to technical procedures need to be "fed back" into the quality circle process to alert EDWG that revision has occurred, so that the periodic review process does not duplicate the ongoing review process.

TC1 - Learning.
Recommendations:

1. **Integrate adaptive management principles with organizational development and quality control tools to produce a project organization capable of learning.**
2. **Develop an effective quality circle process as the only recognized administrative process to implement organizational change through learning.**

Learning is the ability to transform knowledge gathered by the project into changes in project operation. This definition of learning must be placed in the context of adaptive management, and implies not just gathering potentially useful or general knowledge, but the ability to transform such knowledge into specific modifications in management direction that respond to a changing environment.

Central to a learning organization is the concept of flexibility, the ability of the organization to elicit participation and cooperation from appropriate personnel. Membership on committees and work groups should be expected to change as the project moves from pre-design to implementation, and from implementation to operation. Patterns of participation may not become fixed for a long time, and any tendency to view the organization as rigid or permanent is cause for concern.

TC2 - Monitoring.
Recommendations:

1. **Institute ongoing, cooperative review of monitoring procedures and results, with emphasis on translating results into specific management recommendations.**

Administratively, monitoring and evaluation should be distinguished from traditional scientific research. Specifically, monitoring and evaluation in an adaptive management organization create a learning environment. The application of learning depends on the ability to create management direction from experimental results. Adaptive management principles suggest this should be a relatively straightforward and "painless" process, accomplished largely at the management level, without seeking policy approval of every adaptive management decision.

The Project Manager and EDWG Chair provide coordination between management and policy activities, and keep the Policy Group informed of how the organization utilizes monitoring and evaluation in operating the project.

See also the discussion of monitoring and evaluation in Appendix B.

TC3 - Evaluation.
Recommendations:

1. **Specify evaluation results which give a clear indication as to success of experimental activity, and whether such experimental activity adequately addresses project goals and strategies.**
2. **Specify which data, data analysis, and results form the basis for evaluation activities.**
3. **Establish guidelines for disseminating output of the evaluation process.**
4. **Develop evaluation criteria which facilitate the development of specifications for an expert system.**

Although the products of the evaluation process are used in making technical and policy decisions, the evaluation process itself is a scientific exercise, the focus of which is a statistical analysis of the biological questions of survival, reproductive success, long-term fitness and interaction.

In the context of the YKPP, the evaluation process should differ from "tradition" in that it supports adaptive management by recommending specific changes in project operations, particularly in technology processes.

The "flow" of evaluation output will be partially determined by the relationship of headquarters to the field offices. In a strictly hierarchical arrangement, the results of the evaluation process would be sent only to headquarters, which would then disseminate any recommendations for procedural changes at the field office level. In the YKPP, however, there should be a degree of autonomy which allows certain recommendations to go directly to a field office for implementation, with notification to headquarters. Obviously, there must be a distinction between evaluation results which may be implemented by field offices independently, and those which should be implemented only by direction from headquarters. The criteria for making such a distinction will help define the relationship of headquarters to the field offices and will also help define the boundary between major and minor changes to technical procedures.

To facilitate speed in evaluation, an expert system may be incorporated into the information system. The purpose of an expert system would be to speed the translation of data into management recommendations by objectively comparing the results of monitoring and evaluation with established criteria. This is generally accomplished by means of a computer program which asks questions that can be answered only with quantifiable, objective input. Prior to making any commitment to an expert system, it must be established that such a system is needed, and the output of the evaluation process must be related to expert systems in a way that leads to a clear indication of which expert system to acquire, or the determination that an expert system is not appropriate. Selection of an expert system is similar to selection of a CIS in that the process must not be done backward.

TC4 - Record Keeping.
Recommendations:

1. **Recognize that adequate quality control depends on accurate record keeping.**
2. **Establish record keeping criteria which reflect the demands of experimental and supplementation activity, as well as monitoring and evaluation procedures.**
3. **Computerize record keeping to improve accuracy and responsiveness.**

Record keeping is essential to monitoring and evaluation, and involves the collection of data from field and laboratory environments. Data collection in the field environment and the conversion of that data to a permanent record is the major focus of these recommendations, although equal rigor should be employed in laboratory data collection and record keeping. There is recognition of this necessity in the PDR, Appendix A, p. 6, where the need to employ "best available hatchery practices" is discussed. We assume this discussion also recognizes that evaluation of preliminary results may add to existing best hatchery practices for record keeping.

Many field activities such as capturing, weighing and measuring adult and juvenile fish for monitoring purposes are normally carried out by subprofessional employees. Because scientific professionals are not present during data collection activities, there is the possibility of error due to subprofessional employees not understanding scientific and experimental necessities surrounding data collection. Further possibility of error is introduced when the raw, handwritten data collected by subprofessionals is transcribed into computerized format by professionals.

In the YKPP, we recommend reducing the likelihood of the first sort of error by including scientific professionals in data collection activities, and by providing subprofessional employees with training which emphasizes basic experimental method and other principles relating to the importance of accurate data collection and recording. Eliminating the second type of error should be done by training subprofessional employees to enter data directly into a computer and perform immediate checks for accuracy.

TC5 - Information system.
Recommendations:

1. **Establish technical and organizational requirements for an information system, then structure a coordinated information system (CIS) to meet requirements.**
2. **Select a computerized CIS with sufficient flexibility to incorporate features such as a bulletin board and an expert system.**
3. **Establish data management supervision in the Office of Administrative Services to ensure consistency and continuity in data collection, record keeping, data transmission, data storage and retrieval, data analysis, input to monitoring and evaluation, and publication of results.**

Just as it is important that certain technology imperatives determine organizing arrangements, it is also important that certain organizational requirements determine selection of technology. This is particularly true in establishing a CIS, which we assume will be computerized.

Many organizations choose information system technology and then determine its capabilities and limitations. This sequence is backward, and could have significant negative consequences for the YKPP. Because the project represents an attempt to establish a new technology of supplementation, selection of CIS technology must be driven by organizational requirements for data gathering and analysis, monitoring, decision making, learning requirements, and geographic distribution.

Considering that many organizational arrangements and technology imperatives may not be finalized for several years, selection of a CIS should be done with regard to maximum flexibility and expendability. These characteristics should be reflected in terms of over-design for networking, storage capacity, processing speed, multi-tasking, and other features which accommodate expansion and additional features.

Data management includes: data collection in the field and from other entities; record keeping; transmission of data through information systems; access to, storage, and retrieval of data; analysis of data; applicability to monitoring and evaluation; and quality control processes.

The primary administrative concern with data management is to create a "paper trail" which reflects project activity and decision making. This is not only to ensure accountability, but also to make information flow along a regularized path and thereby improve organizational functions which depend on data management for their quality and timeliness.

Questions which should be resolved in the course of establishing data management procedures include: Which project functions depend on prompt and accurate data, and from which organizational elements? What form does data have to take to be useful to a particular organizational element? Which

elements of the project require data that has been analyzed or translated? For each data output, what are the consequences of tardiness or non-availability? What contingency plans can be developed in the technical and policy decision processes to compensate for lateness or absence of data?

Other aspects of data management are covered under learning, history, formal communication, record keeping, and information systems.

PA - Physical Design.
Recommendations:

1. **Design and construction of project facilities should be consistent with project goals and strategies.**
2. **Design and construction of project facilities should allow for maximum flexibility to adapt to changing project requirements.**
3. **Appearance and spatial configuration should promote the desired organizational culture of the project.**

We proceed from the assumption that there are certain technology imperatives which determine or influence physical design features. An example is the scientific necessity to maintain a minimum separation between acclimation ponds. Facility size, capacity, and layout will be determined mostly by demands of fish culture and experimental necessity, which are products of project goals and strategies.

Because the project involves change-oriented concepts such as adaptive management, learning, and evaluation, experimental and production options must be left open to the greatest extent possible. Physical facilities should reflect the need for flexibility. For example, this may involve providing for a higher degree of separation and isolation between groups of fish than would be found in an ordinary production facility. Facilities may have to be larger than normal, or present the opportunity to handle a variety of fish species, or allow for disassembly and reconfiguration to adapt to special needs. This may require re-thinking established concepts of cost-effectiveness in regard to facilities construction and operation.

It seems appropriate to offer a caution against a "backward" approach to facility design, wherein a standard hatchery plan is transferred to the project without consideration of special requirements imposed by the effort to demonstrate a new technology. As explained in the discussion of technology imperatives, tools should be selected according to a careful analysis of the processes to which they will be applied. Since these processes are likely to change in the YKPP, physical design requirements will also change over time. Early commitment to a standardized, non-adpatable physical design is a determination that makes change and adaptive management more difficult. This is recognized in the PDR, Appendix A: "Substock-specific culture and disease management requirements will be accommodated within basic facility design." (See also Appendix B, p.10.)

There has been some discussion of designing at least one facility, probably the project headquarters, in a way which reflects the fisheries resource and cultural elements of the Yakima Indian Nation. Specifically, it has been suggested that the headquarters building resemble a longhouse. While such a suggestion may at first appear frivolous, its value in developing the desired organizational story and solidifying the organizational culture should not be underestimated.

PB - Spatial Configuration.
Recommendations:

1. **Arrange internal location of people, offices and common facilities to promote communication and interaction among project employees.**
2. **Seek consultation to determine appropriate spatial configuration.**

Spatial configuration of the workplace is a separate science, beyond the scope of these recommendations and outside the expertise of the PSU Administrative Design Team. Consulting should be undertaken to determine the appropriate internal arrangement of field offices and headquarters.

Of particular concern is the need to integrate professional and subprofessional employees. Consideration should also be given to locating employees so as to break down the organizational barriers which tend to form according to job assignment. Employee behavior can be influenced by such seemingly trivial items as location of drinking fountains and lunch rooms.

PC - Decentralization.
Recommendations:

1. **Recognize the decentralized nature of the project in job design, work flow design, staffing level, scheduling and assignment, and training.**
2. **Recognize that the project involves geographic and management dispersion, seasonality, and growing complexity.**
3. **Establish a concept of area management rather than facility management.**

Decentralization has a dual meaning in the context of this project. First, it refers to the fact of geographic separation and the likelihood that each field office will have to be a "center" for a variety of scientific and technical skills. Organizing project activity in a centralized manner would require that employees with specialized skills be moved from one facility to another, as their skills were required. This would have negative consequences in terms of scheduling and assignment, and would result in "logjams" while tasks waited for qualified personnel.

Second, decentralization also refers to the consecutive (as opposed to repetitive) nature of project operation and the likelihood that particular skills

and expertise will not be "located" in an individual, but in a team or quality circle. Skills and responsibilities are diffused rather than concentrated. Supervision is diffused in that it does not flow entirely in a downward, vertical manner, but is a cross-cutting function which respects concepts of a Theory Y organization. Team building, quality circles, and other participatory management techniques cannot be expected to work if the project is organized in a highly centralized manner.

Decentralization has no negative connotation, and does not refer to any weakening of technical skills or organization. Decentralization is an asset to the project, and supports other desirable organizational features such as quality circles and team building.

Dispersion involves the fact of geographic separation of facilities, but it goes further in recognizing a management structure which extends beyond the geographic area of the project itself. Personnel currently active in project management are located in Portland, Olympia, Kalama, and locations scattered throughout the project area. Experimental goals and harvest management involve agencies throughout the Columbia Basin and the Pacific Northwest.

Traditional facilities management concentrates on defining points in time and points on the map, but the YKPP involves so many such points that capturing and coordinating them all in a management plan will prove impossible. As fish move through their seasonal development, they also move across an area of geographic space, not simply point to point. To state the obvious, fish do not cease to exist as they move from one monitoring site to another. The concept of area management will become better appreciated as more substock information is integrated with habitat evaluation and management. A complex management picture is implied by the discussion of genetics in the PDR, Appendix A, pp. 14-17.

Area management integrates the facts of seasonality, geographic separation, decentralization within the project area, and dispersion outside the project area. It implies management of facilities and resources over an area, rather than at a number of discrete points. An adaptive management model capable of integrating new substock information with ongoing project and subbasin activities will be necessary.

Abbreviations.

AOP - Annual Operating Plan.
AWP - Annual Work Plan.
BIA - Bureau of Indian Affairs.
BOD - Board of Directors.
BPA - Bonneville Power Administration.
CBFWA - Columbia Basin Fish and Wildlife Authority.
CEO - Chief Executive Officer.
CIS - Coordinated Information System.
CRITFC - Columbia River Inter-Tribal Fish Commission.
EDWG - Experimental Design Work Group.
EPA - Environmental Protection Agency.
HRTMPC - Human Resources & Team Management Planning Committee.
M&E - Monitoring and Evaluation.
MEPG - Management Entities Policy Group.
NPPC - Northwest Power Planning Council.
ODC - Organizational Development Committee.
ODFW - Oregon Department of Fish and Wildlife.
OJT - On the Job Training.
OMA - Operation and Management Agreement.
OTS- Office of Technical Services.
PAC - Policy Advisory Committee.
PDR - Yakima/Klickitat Production Project Preliminary Design Report of April 1990.
PAG - Policy Advisory Group.
PG - Policy Group.
PNUCC - Pacific Northwest Utilities Conference Committee.
PSU - Portland State University.
TSA - Technical Services Advisor.
TWG - Technical Work Group.
USBR - US Bureau of Reclamation.
USFWS - US Fish and Wildlife Service.
WDF - Washington Department of Fisheries.
WDW - Washington Department of Wildlife.
YIN - Yakima Indian Nation.
YKPP - Yakima/Klickitat Production Project.

YAKIMA-KLICKITAT PRODUCTION PROJECT

ADMINISTRATIVE DESIGN GROUP

APPENDIX A - INTERVIEWS

YAKIMA-KLICKITAT PRODUCTION PROJECT

ADMINISTRATIVE DESIGN GROUP
SUMMARY OF INTERVIEWS

The interview highlights presented here are the result of over 50 interviews with the key participants in the Yakima Klickitat project, and with key informants whose experience can contribute to the administrative design.

All interviews were conducted by the YK Administrative Design Staff on a confidential basis. The notes developed from these interviews are retained by Portland State University. The information gained from the interviews was used to help design the modified Delphi questionnaire, and to guide the group dynamics process. It also will be used in the final report. There has been a continuous process of interaction between the four research activities. The interviews were largely unstructured. The objective was to obtain information which the respondents thought was relevant to the organizational design and administrative arrangements for the design, construction, and operation phases of the Yakima Klickitat Project. The interviews and re-interviews will continue as the project approaches completion.

Several of the issues raised were not related to the scope of work of this project. Only those issues are summarized that have a bearing on organizational issues of the YKPP.

1. The Council established production and supplementation as two co-equal goals. How to define supplementation was one of the basic issues running throughout the interviews. While EDWG has come up with a definition that involves several methods of enhancing natural fish runs through artificial production, the use of the term has a wide variety of meanings to many of the participants. Despite this ambiguity, it is perceived as an attainable goal of the project by most informants.

2. Can the two goals of supplementation and production both be optimized in the implementation stages of the program? This was an underlying question and it was addressed in many forms. Those with a background in production strongly advocated that production measured in pounds of fish come first and supplementation, if it could be done, be a secondary objective. The reverse was felt strongly by those more involved in fishery research issues. This was often expressed in terms of whether the YK project manager should have mainly a production background, a research background, or a background in administration relating to fishery management.

3. A similar concern was how to build appropriate communication between a production unit in charge of the hatchery complex and a monitoring and evaluation staff (often called research, or supplementation) in charge of field monitoring and project evaluation. Many people had perceptions of an

organization of these two boxes and discussed many of the problems they felt in such an organization. Some felt the need for a top box to coordinate these two boxes. Issues of cross-delegation and joint supervision were raised. Others felt that we should not separate production people from monitoring and evaluation people. There is a need to integrate people and tasks. Some suggested a matrix-type organization. Another suggestion was to build a quality circle process into the dynamics of the organization.

4. Many research issues were raised. When does research end and feed into application and implementation? For instance, EDWG designs a monitoring and evaluation system. When it is approved and accepted by the appropriate agency, does it then become a part of the operation of the project? Or, does it remain a research project? How are research alternatives and objectives developed, and who initiates and approves research objectives? There was a difference in expectations of what research is supposed to accomplish. For instance, is it to meet BPAs program needs, or to contribute to scientific knowledge? There was opinion that too much budget flexibility destroys creativity. There is a tendency to continue research rather than make specific conclusions and move on to the next step.

5. A related issue is the way in which the YK Project utilizes information generated by the monitoring, evaluation, and research activities of the project. How does the information generated flow to other entities into the basin in a timely and useful manner? How does the information flow to the scientific community at large? How long should data dealing with genetics, natural production, or enhancement from artificial means be tested before the results are accepted? What is the appropriate role of peer review? Many expressed these concerns in terms of adaptive management, but few respondents had a very clear idea of how adaptive management would work. The typical informant's frame of reference is in traditional organizational models and dynamics. One of those interviewed indicated that his research had found that none of the Canadian or State fishery agencies had a structured or effective institutional learning process.

6. The multiplicity of governmental institutions participating in the Columbia Basin Fish and Wildlife program and the Yakima Klickitat Production Project has caused questions about division of responsibilities between agencies for planning, funding, implementing and coordinating. This issue was foremost on the minds of many participants and was expressed in a variety of concerns. A related issue was not only in defining what is policy and what is administration, but who is to decide policy. Those we interviewed who identified themselves as technical or program people complained of lack of what they considered adequate direction by policy people, as well as lack of effective communication with the management entities policy body. The managers did not feel communication was a problem, but some expressed concern that Bonneville contract people had undue influence in the fishery agencies policy decisions because of their funding responsibilities.

7. Differences between biology-oriented and engineering-oriented organizations and professional staffs were expressed in the form of different expectations for project outcomes. The biological community is used to dealing with the uncertainties of threshold parameters, while the engineering community is accustomed to managing programs with more certain outcomes.

8. In moving from grants to contracts, the BPA has also changed its levels of expectation of performance for the use of BPA funds. During the early years following the passage of the Northwest Power Planning Act, BPA funded most ideas that were approved by the Power Planning Council without too much scrutiny. As the program progressed, results were expected in the form of additional fish. This led BPA to a tougher stance and increasingly raised concerns of cost effectiveness. On the other hand, the fishery agencies and the tribes have been accustomed to BIA, Federal F&W, and earlier Bonneville contracting and grant procedures. The tougher compliance stance has caused friction in the working relations between BPA and the YIN.

There were comments that BPA had not always clearly stated what it wanted to contract for in biological research efforts. Some informants explained that BPA might publish a request for proposals (RFP), then change its mind about the specifications and deliverables during its review of proposals, and finally settle on something rather unexpected in letting the final contract. One informant attributed this phenomenon to the fact that RFPs were written by different people than those who reviewed the proposals.

Some informants also commented BPA expects quick turn around on the part of the contractors, but then may take a long, unspecified time in awarding contracts.

9. A fundamental issue relating to point 6 above is the role of BPA in the exercise of its funding responsibilities and its role in project oversight. With few exceptions, the implementation direction for most of the fish and wildlife program has been specified in BPA interagency agreement contracts and grants, or with contracts to private groups. Subcontracts and subcontractors must be approved by BPA. BPA states that contract objectives and tasks to be performed are developed by the contracting agency in annual work plans and they do not dictate work plans. Most people accept this arrangement because it supplies them with the funds they need to achieve their objectives. However there appears to be continuing conflict between what is project management and contract compliance, and questions about how these two processes should interact?

10. There was general agreement among those interviewed that there was good working relationships between YIN, WDF, and WDW. The project leader was a great asset in providing timely information. There was a sincere interest among all parties to make the project a success and move the project forward as quickly as possible. The three policy people sitting on the managers group for the agencies and the project manager also play a vital role in communication with other agencies, BPA, and the Council.

11. A major source of conflict identified in the interviews was the difference in value orientation between the agencies. For example the value orientation of the members and leaders of the Yakima Indian Nation is based upon their experience over centuries of resource management. They have institutional memory as to the way the fish runs were and the way they are today. While BPA is concerned with how the fishery operates today and how it is likely to be when the YK program results are accomplished, BPA has no institutional values associated with past fisheries. Another cultural difference between the two agencies is their attitude toward nature. BPAs past experience has largely been devoted to mastering nature, while YIN cultural values relate more to living in harmony with nature.

12. There was considerable interest expressed in how the Annual Operating Plan would replace contracts as the working document and better define relative roles of funding by BPA and implementation by YIN, WDF and WDW. The three acting as the YK management agency establish project policy. Several of those interviewed expected this role to be expanded when the annual operating plan process is in place, as well as when the implementation organization is approved by BPA.

13. There was general agreement among most of those interviewed that the Yakima Indian Nation (YIN) should be the lead agency for management of the project. However, there was concern that the tribe does not at this time have sufficient management experience and capability to manage such a large operation. The YIN has a large historic stake in promoting the project. They have a very strong interest in getting the fishery restored in the Yakima basin. They have the largest staffs of fishery professionals and non-professionals in the basin. There was also considerable concern that the YIN tribal political and administrative system could not effectively provide day to day administration of the project, and that the project should have some sort of independent status.

14. Concerns as to YIN management capability were expressed by many respondents. Some expressed frustration in getting policy attention and policy decisions from the Tribal Council and/or the YIN Fish and Wildlife Committee in a timely manner. The Tribal business council has difficulty getting too far out ahead of its constituents and the general council. It therefore often has difficulty responding to the demands of external agencies. Personnel concerns raised were competitive pay levels, job security, Indian preference, and competitive fringe benefits such as health insurance. Intra-tribe administration procedures were looked upon as slow to respond to need. It was also felt that there was not sufficient communication between tribal policy makers and the staff. The tribe as well as other contracting agencies have had great difficulty in responding to BPAs tougher contractual compliance requirements. There has been some effort by BPA to give the tribes and fishery agencies training in contract administration

15. Some of the respondents stated that either the Bureau of Indian Affairs (BIA) or a Federal F&W agency should play a role in the operation of the YK project. Some proposed that the USFWS might operate the hatchery for BPA and the tribe on an interim basis, until the tribe had developed additional administrative capacity to manage a large project like YK. Others suggested that NMFS had a role to play

16. There were numerous suggestions that monitoring and evaluation (M&E) had to be tied in with production management, should have a continuing influence on both policy and management decisions, and should be focused to measure the results of the production program.

17. There was considerable discussion that the YK project was much bigger and more complex than most people realized. This usually dwelt on the fact the production function for the project was substantially different than traditional hatchery operations, and that the institutional complexity was most difficult for people not closely connected to the project to understand.

18. There was comment that some of the tribes in Puget Sound run fairly large and complex hatchery operations. There was additional comment that not much cross-learning among the tribes had occurred, particularly between coastal and inland tribes.

19. Most informants commented that EDWG should continue, but there were differing views on how its role in the project organization should evolve. There was high regard for the quality of the research and experimental design by EDWG. There was criticism of its outward communications.

20. The general view of those commenting on the YK Project Technical Advisory Committee was that it did a good job in keeping people informed of what each was doing. There were some suggestions that the Technical Work Group (TWG) could be more effective.

21. There was considerable interest expressed by people not connected with the project in establishing an advisory committee to the Policy Group that would communicate the interests of affected publics other than the government agencies such as Indian and non-Indian fishery organizations, irrigation districts, and county governments. There needs to be a formalized process to assure effective interaction with these groups. Because of the late start of the public information program, there was serious concern that time was lost in getting affected interest groups on the project learning curve.

22. Opportunities for contracting out parts of the administration were brought up in several forms. One example was to have an independent M&E team that would not be subject to covering up policy and administrative failures. Since a critical part of adaptive management is to learn from failure, the free flow of information is fundamental to successful organizational dynamics.

23. Desire for public information, education, and a process for public involvement in a timely manner were expressed by several of those interviewed. Some strongly recommended a high-level advisory group to the Management Entities Policy Group.

24. Many felt that improved peer review efforts of the project's scientific work would aid in acceptance of findings.

YAKIMA-KLICKITAT PRODUCTION PROJECT

ADMINISTRATIVE DESIGN GROUP

APPENDIX B

MODIFIED DELPHI SURVEY

Yakima-Klickitat Production Project
Administrative Design Group

Modified Delphi Survey - Summary

The modified Delphi survey has proven very productive, even though it will not produce consensus or convergence on the issues. Oddly enough, one of the criticisms of the Delphi process is that it forces participants into consensus (Sackman, 1975, p.48). We find just the opposite, that participants are not at all intimidated by the fact that their opinions differ from the "norm." Perhaps this is because we are dealing with a hand-picked group of "insiders," most of whom formed fairly strong opinions long before our survey.

We are encouraged by the fact that diversity of judgements was not trampled in the survey process. We elicited many interesting comments and ideas through the survey, and these have proven most helpful in explaining the results.

Survey results are shown in two different ways - unsegregated and segregated.

The "unsegregated" results show the responses of all participants together, with the normal distributions in the first and second rounds compared. Some convergence can be seen on particular issues, while little agreement appears on other issues. We conclude that movement toward convergence indicates issues of lesser concern to the participants, while resistance to convergence indicates issues where opinions are stronger or the stakes are considered higher. Generally, questions that show agreement in the first round also show agreement in the second round, while questions that show a wider variety of professional judgements in the first round retain that variety of judgements in the second round. In other words, the respondents appear to hold definite opinions and seem to stick with them.

In examining the unsegregated results, the length of each shaded bar indicates the relative agreement or disagreement about a particular issue. A shorter bar indicates that the opinions expressed by the respondents tended toward agreement. A longer bar indicates a wider diversity of judgements. Where a longer bar is shown for Round One, and a shorter bar for Round Two, there is a tendency for respondents to move from disagreement to agreement. This is what we call "convergence."

In what we call the "segregated" analysis, responses in the second round are shown by three categories, labelled State Agencies (SA), Ratepayers & Funders (RF), and Indian Interests (II). Each category consists of selected individuals who are known to be associated with a particular interest, and thus are assumed to represent that interest in the project. The SA category consists of 10 respondents who are associated with Washington Department of Fisheries (WDF) and Washington Department of Wildlife (WDW). The RF category consists of 6 respondents who are associated with Bonneville Power Administration (BPA), and the Pacific Northwest Utilities Coordinating Committee (PNUCC). The II category consists of 10 respondents who are associated with the Yakima Indian Nation (YIN), the Columbia River Inter-Tribal Fish Commission (CRITFC), and the Bureau of Indian Affairs (BIA).

The segregated method of showing survey results is chosen because it points out differences of judgements on issues where perspective differs according to the role of the participants in the project. We realize that there is a risk of generalization by placing respondents in categories, but we feel it necessary to examine responses according to whether the respondents are accountable to state agencies, ratepayers, or Indian interests. This method of examination is somewhat justified by the fact that there are dramatic differences of judgements evident on some questions, and almost no conflict on others. Additionally, there

is a "levelling" effect, so that one interest area does not dominate the survey by having more people respond to the survey.

It is interesting to compare the unsegregated results with the segregated results. As the unsegregated results suggest, there appears to be general agreement on many issues concerning the project, a fact we find encouraging. The segregated results indicate issues where differences of judgements remain, or where there may be confusion about terms and definitions. We find this useful because it allows us to concentrate our efforts on discovering why opinions differ, and how to pursue resolution of issues.

Where recommendations are included, they are qualified as "initial recommendations" and are meant to suggest administrative issues which require attention during organizational design. These initial recommendations are based on preliminary analysis of the Delphi survey, personal interviews and group exercises. They are not final recommendations, and merely indicate what we believe will be productive exercises in developing final recommendations for an organizational design.

In our analysis of survey results, we have arranged our written comments for a particular question first, followed by the unsegregated results for that question, and finally the segregated results for that question. We hope this will assist the reader in relating our written comments to the results, and in comparing unsegregated and segregated results to each other.

As always, we encourage questions, comments and criticisms. Please feel free to call Lee Shissler at Portland State University, (503) 725-4050.

Yakima-Klickitat Production Project
Administrative Design Group

Modified Delphi Survey - Results

1A. Funding uncertainties. In the unsegregated results, there appears to be relatively little concern about funding uncertainties.

In the segregated results, we see that the RF group considers funding uncertainties to be of relatively less importance than the SA and II groups. This is expected, since representatives of the funding agency tend to view the allocation of funds as routine and fair, because it is a process they carry out and enforce. Representatives of the groups which count on receiving monies from the funding agency are understandably more apprehensive. In any organizational relationship, those who approve funding are more confident about the process than those who apply for funding. Altogether, there appears to be relatively little concern that funding will be a problem. We also expect some improvement over time, as the budget process becomes refined through practice

1B. Policy clarity. All groups consider this question to be relatively important. The segregated results indicate that this is a concern shared by respondents in all categories. Each group is perhaps unclear about the policy making process and the policy outcomes of the other. Comments also suggest that some respondents are not entirely comfortable with the policy direction they receive from within their own agencies. We initially conclude that organizational design should provide a policy process that results in a high level of investment by the participating entities, clearly articulated outcomes, and a generalized understanding of project goals and objectives.

1C. Information flow. There appears to be a moderate degree of concern that information is inadequate or difficult to obtain. The segregated results indicate that respondents in all categories share this concern, although those in the RF group appear more satisfied. Some concern may be attributed to the sheer size and complexity of the project, and the challenge of moving information among the many participants. There may be a need for a formalized process of information exchange, including a careful definition of terms and frequent updates on the activities of different segments of the project. This appears particularly important in light of the dispersed (as opposed to centralized) nature of the project, as well as the importance of information flow to meeting adaptive management objectives.

1D. Management-funding disagreement. In the segregated results, the RF category shows particular concern with this aspect of the project. We attribute this mostly to the fact that the funding agency has specific, routinized administrative procedures which are not well understood by the other entities. There appears to be some frustration on the part of the funding agency that the other participants have not embraced these procedures. We initially conclude that there is a need for a formalized process that reconciles differences in administration, management, funding, contracting and accounting. Such a process will have to satisfy the legal mandates and administrative requirements of all participants, and may demand considerable flexibility on the part of all participants. We look forward to a period of initial struggle with this issue during the first year or two of project operation, followed by a transition toward adjustment and accommodation.

1E. Administrative differences. This relates closely to 1D above. Our initial conclusions are similar to those for 1D.

1F. Salary and work environment. The unsegregated results indicate relatively little concern. According to the segregated results, however, the RF respondents express some

concern with this issue. Most of this can be attributed to long hours, travel requirements, and lack of clerical support for funding agency staff. We expect these concerns to diminish as additional resources are made available to the project.

2A. Separation of management and funding decisions. Unsegregated results indicate a rather high degree of concern, which can be better understood by examining the segregated results. The SA and II respondents express a need to separate management from funding, while the RF respondents consider such separation less useful. Generally, representatives of the funding agency believe that management decisions must be connected to cost-efficiency considerations. Representatives of the management agencies worry that concern with cost-efficiency will place inappropriate constraints on choosing management alternatives. Our initial conclusion is that a formal, explicit boundary between management and funding decisions would be very useful. This would provide project managers the assurance that they could operate within specific parameters to choose appropriate monitoring & evaluation and production alternatives. The funding agency would be assured that cost-efficiency criteria could be applied, at the very least, to assist in choosing between equally effective monitoring & evaluation and production alternatives.

2B. Policy objective definition. According to unsegregated and segregated results, all respondents feel that efforts to better define policy would be very useful. This relates to the concerns expressed in 1B above. It underscores our initial recommendation to develop a formalized process that results in a high level of investment by the participating entities, clearly articulated outcomes, and a generalized understanding of project goals and objectives.

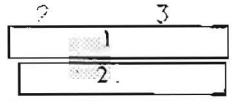
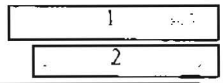
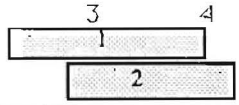
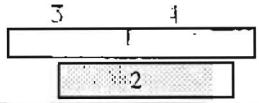
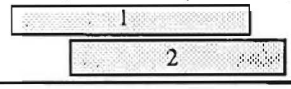
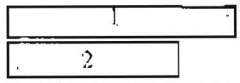
2C. Information and communication improvements. All respondents attribute a high degree of usefulness to improvements in this area. Unsegregated and segregated results confirm each other. This relates to 1C above, and adds emphasis to our initial recommendation to develop a formalized process of information exchange.

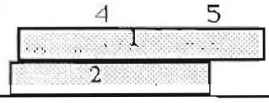
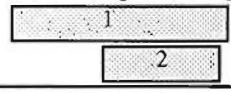
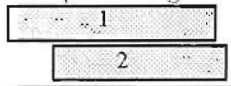
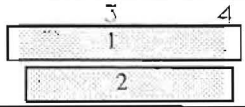
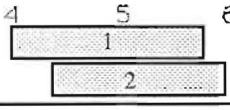
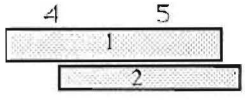
2D. Salary and work environment. Although unsegregated results show this to be the area of least concern in Question 2, the segregated results indicate a difference in response according to agency affiliation. Comments reveal different concerns by respondents in different categories. The SA respondents express relatively little concern with this issue. This is attributed to the fact that most SA respondents view themselves as professionals who are reasonably well-placed in agency careers. Concern by RF respondents is attributable to workload concerns expressed in 1F above, rather than inadequate pay or lack of job security. II respondents seem concerned more with adequacy of salary and benefits, parity with comparable professionals in similar organizations, and the threat of high employee turnover. We believe that resolving concerns about funding uncertainties and differences in administrative procedures will help address these concerns. Some unavoidable concern will remain during project start-up and transitional phases. We expect incremental improvement over time.

2E. Administrative coordination. All respondents express a high degree of concern, with particular concern shown by those in the RF category. This relates to the concerns expressed in 1E above. Funding agency respondents are somewhat critical of the perceived lack of administrative ability in the management entities. Management agency respondents are somewhat skeptical of what they perceive to be overly complex administrative procedures of the funding agency. We are encouraged by the fact that all respondents recognize a need to resolve administrative differences. We refer to our initial recommendation (in relation to 1D and 1E) to reconcile differences in administration, management, funding, contracting and accounting.

2F. Defining roles and responsibilities. All respondents viewed this as a useful endeavor. Comments suggest that this relates mostly to project size and complexity. Many participants see this as the first step to getting the project more firmly under control as an effort to define "who does what." We initially conclude that any organizational design should include a specific definition of "who does what," as well as a regular re-examination of the roles and responsibilities of participating entities.

Yakima-Klickitat Project, Delphi Survey, Unsegregated Results

1. Which of the following are problems that limit your effectiveness as a project participant?	no problem	Top bar=Round One Bottom bar= Round Two	extreme problem
A. Funding uncertainties.	1 2 3 4 5 6 7		
B. Lack of clear decisions from policy makers.	1 2 3 4 5 6 7		
C. Inadequate flow of information.	1 2 3 4 5 6 7		
D. Disagreement between management agencies & funding agency.	1 2 3 4 5 6 7		
E. Differences in administrative procedures of participating agencies.	1 2 3 4 5 6 7		
F. Inadequate salaries & adverse work environments.	1 2 3 4 5 6 7		

2. Which of the following are improvements that would benefit the project?	would be of little benefit	Top bar=Round One Bottom bar= Round Two	would be of great benefit
A. Separation of management decisions from funding decisions.	1 2 3 4 5 6 7		
B. Precise definition & explanation of policy objectives.	1 2 3 4 5 6 7		
C. More effort toward information & communication.	1 2 3 4 5 6 7		
D. Inceased salaries & improved working environments.	1 2 3 4 5 6 7		
E. Coordination of administration among participating agencies.	1 2 3 4 5 6 7		
F. Clearer definition of roles & responsibilities of participating agencies.	1 2 3 4 5 6 7		

Yakima-Klickitat Project, Delphi Survey, Segregated Results

1. Which of the following are problems that limit your effectiveness as a project participant?	no problem	SA= state agencies RF=ratepayers & funders II= Indian interests	extreme problem
A. Funding uncertainties.	1 2 3 4 5 6 7	SA, RF, II	
B. Lack of clear decisions from policy makers.	1 2 3 4 5 6 7	SA, RF, II	
C. Inadequate flow of information.	1 2 3 4 5 6 7	SA, RF, II	
D. Disagreement between management agencies & funding agency.	1 2 3 4 5 6 7	SA, RF, II	
E. Differences in administrative procedures of participating agencies.	1 2 3 4 5 6 7	SA, RF, II	
F. Inadequate salaries & adverse work environments.	1 2 3 4 5 6 7	SA, RF, II	

Yakima-Klickitat Project, Delphi Survey, Segregated Results

2. Which of the following are improvements that would benefit the project?	would be of little benefit						would be of great benefit
	1	2	3	4	5	6	7
A. Separation of management decisions from funding decisions.			RF	SA	II		
B. Precise definition & explanation of policy objectives.					SA, RF, II		
C. More effort toward information & communication.				SA, RF, II			
D. Inceased salaries & improved working environments .		SA	RF, II				
E. Coordination of administration among participating agencies.					SA, II	RF	
F. Clearer definition of roles & responsibilities of participating agencies.				SA, RF, II			

SA= state agencies
RF=ratepayers & funders
II= Indian interests

3A, 3B, 3C, 3D. Project purposes. There appears to be relatively little disagreement, with most respondents hewing closely to stated project goals.

In the segregated results, representatives of the funding agency express some concern that inclusion of 3C might lead to excessive costs. In their comments, virtually all respondents view benefits to YIN culture as desirable, with representatives of the II category naturally placing more importance on this aspect as an end in itself. Comments suggest that if the project fulfills its stated goals, 3C will be a logical outcome. We initially conclude that almost all participants have project purposes clearly in mind, providing what may be the firmest common ground on which a diverse group of participants can stand. It may prove useful to provide for a frequent re-statement of project purposes in order to foster cooperation. The project leader has made an effort to state and re-state project purposes frequently and explicitly, and we initially recommend that such re-statement be incorporated into the organizational design.

4A, 4B. High vs. low technology. Comments reveal a great deal of confusion about terms. There is almost no agreement on what constitutes state-of-the-art, or what existing hatchery practices are. Follow-up discussions reveal that most participants believe in some automation, but are wary of exotic or unproven technology. There remain, however, two identifiable "camps" at opposite ends of this issue. One camp believes that every effort must be made to employ whatever automated processes will reduce human error in routinized, repetitious evolutions. The other camp believes that automation promotes catastrophic failure, and prefers to rely on manual procedures for every aspect of fish culture. We initially recommend that project physical design provide maximum possible flexibility to shift between automated and manual processes.

In light of the adaptive management concept, we initially recommend that there be frequent evaluation of automated vs. manual processes as they concern every aspect of the project. Frequent review of all monitoring & evaluation and production processes is required to avoid becoming entrenched in what is familiar simply because it is familiar.

5A, 5B, 5C. Training and education. This question is intended to measure appreciation for the idea that the project should provide for circulation of knowledge at least throughout the Columbia Basin, and perhaps further afield.

Unsegregated responses show a natural inclination to be more concerned about the project itself and less concerned with the "outside world." Even so, there appears to be some recognition that efforts should be made to educate project participants in a variety of disciplines.

Segregated results and comments by funding agency participants reflect a concern with containing costs associated with education, and respondents in the RF category are more likely to comment that project personnel should not receive a comprehensive education at project expense. We initially recommend that the management entities and the funding agency consider, as part of formulating the annual operating plan, a cooperative review of the appropriateness and effectiveness of education and training alternatives.

Yakima-Klickitat Project, Delphi Survey, Unsegregated Results

3. The purposes of the project are:	disagree 1	2	3	4	5	6	agree 7
	Top bar=Round One. Bottom bar= Round Two						
A .To produce research information which will help improve supplementation efforts throughout the Columbia Basin .						1 2	
B. To produce more anadromous fish.						1 2	
C. Preserve traditional culture in the Yakima Indian Nation.				1 2			
D. Address questions of species interaction and genetic risk.					1 2		
4. The project should be constructed and operated:	disagree		Top bar=Round One Bottom bar= Round Two				agree
A. According to state-of-the-art specifications, involving a high degree of automated operation.				1 2			
B. Similar to existing hatcheries, using conventional operating practices.		1 2					
5. Training & education programs should involve:	to a smaller degree		Top bar=Round One Bottom bar= Round Two				to a larger degree
A. Personnel involved directly with the project.						1 2	
B. Personnel involved in similar projects throughout the Columbia Basin.				1 2			
C. A wide variety of scientific & technical personnel involved in diverse research & technical fields.				1 2			

Yakima-Klickitat Project, Delphi Survey, Segregated Results

SA= state agencies
RF=ratepayers & funders
II= Indian interests

3. The purposes of the project are:	disagree 1	2	3	4	5	6	agree 7
A. To produce research information which will help improve supplementation efforts throughout the Columbia Basin.					SA	RF	II
B. To produce more anadromous fish.					SA	RF	II
C. Preserve traditional culture in the Yakima Indian Nation.			RF	SA	II		
D. Address questions of species interaction and genetic risk.					SA	RF	II

SA= state agencies
RF=ratepayers & funders
II= Indian interests

4. The project should be constructed and operated:	disagree 1	2	3	4	5	6	agree 7
A. According to state-of-the-art specifications, involving a high degree of automated operation.					SA	RF	II
B. Similar to existing hatcheries, using conventional operating practices.			SA	RF	II		

SA= state agencies
RF=ratepayers & funders
II= Indian interests

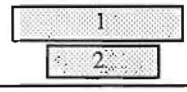
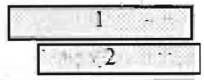
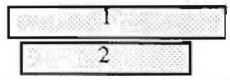
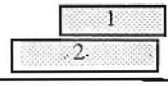
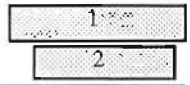
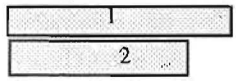
5. Training & education programs should involve:	to a smaller degree 1	2	3	4	5	6	to a larger degree 7
A. Personnel involved directly with the project.						SA RF	II
B. Personnel involved in similar projects throughout the Columbia Basin.					SA	RF	II
C. A wide variety of scientific & technical personnel involved in diverse research & technical fields.				SA	RF	II	

6. Training emphasis. Unsegregated and segregated results indicate a general agreement on the following priority in training: fish production, monitoring & evaluation, data collection & analysis, scientific research, traditional hatchery skills, and administration & policy.

Responses show relatively little difference of judgements about training emphasis, except in segregated results for 6D and 6E, which are related. Respondents in the RF category comment that monitoring & evaluation (M&E) sometimes comprises too much of the total cost of a project. This is a particular problem when the results of M&E are inconclusive, or do not lead to specific management recommendations. We initially recommend that there be a periodic, cooperative review of M&E results, with a particular emphasis on translating such results into specific management direction. We initially recommend that such review involve a M&E advisory committee such as EDWG or its successor, a production advisory committee, and the funding agency. This would help meet adaptive management expectations, and would provide the management entities with appropriate guidance in selecting from alternatives, and would assist the funding agency in meeting cost-efficiency expectations.

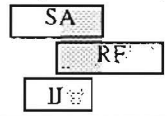
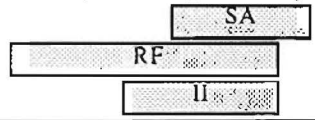
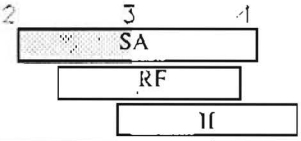
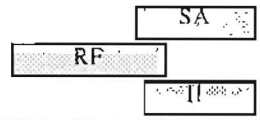
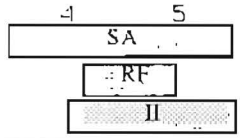
6E. Monitoring & evaluation. Comments received on the survey and personal interviews suggest a need to define "monitoring & evaluation" and distinguish it from traditional research. We believe the YK project represents supplementation as a new technology, and this suggests the need for delineating a boundary between research and monitoring & evaluation.

Yakima-Klickitat Project, Delphi Survey, Unsegregated Results

6. Training of project personnel should emphasize:	should receive lesser emphasis	Top bar=Round One. Bottom bar= Round Two	should receive greater emphasis
A. Fish production techniques.	1 2 3 4 5 6 7		
B. Scientific research.	1 2 3 4 5 6 7		
C. Administration & policy.	1 2 3 4 5 6 7		
D. Data collection & analysis.	1 2 3 4 5 6 7		
E. Monitoring & evaluation.	1 2 3 4 5 6 7		
F. Skills similar to those emphasized in existing fish hatcheries.	1 2 3 4 5 6 7		

Yakima-Klickitat Project, Delphi Survey, Segregated Results

SA= state agencies
RF=ratepayers & funders
II= Indian interests

6. Training of project personnel should emphasize :	should receive lesser emphasis 1 2 3 4 5 6 7 should receive greater emphasis
A. Fish production techniques.	
B. Scientific research.	
C. Administration & policy.	
D. Data collection & analysis.	
E. Monitoring & evaluation.	
F. Skills similar to those emphasized in existing fish hatcheries.	

7. Satisfaction with participating entities. Responses to this question reveal some of the difficulties that might be expected when a diverse group of agencies enter into a cooperative venture such as the YK project. No clear picture emerges from responses to this question. Some respondents expressed dissatisfaction with their own agencies, and some were dissatisfied with other agencies. Some dissatisfaction is attributable to personality conflict, and will be overcome by cooperating to build a mutually acceptable organizational structure.

We do not interpret a lack of satisfaction with any particular agency as a blanket condemnation. Quite the opposite. Criticism usually focused on a particular aspect of an agency's operation, and was often accompanied by suggestions for improvement. Particularly in Round Two of our survey, criticism tended to be informed and constructive. We are encouraged by a general recognition that efforts should be made toward specific improvement in inter-agency relations, and a willingness to devote time and resources to that end.

Yakima-Klickitat Project, Delphi Survey, Unsegregated Results

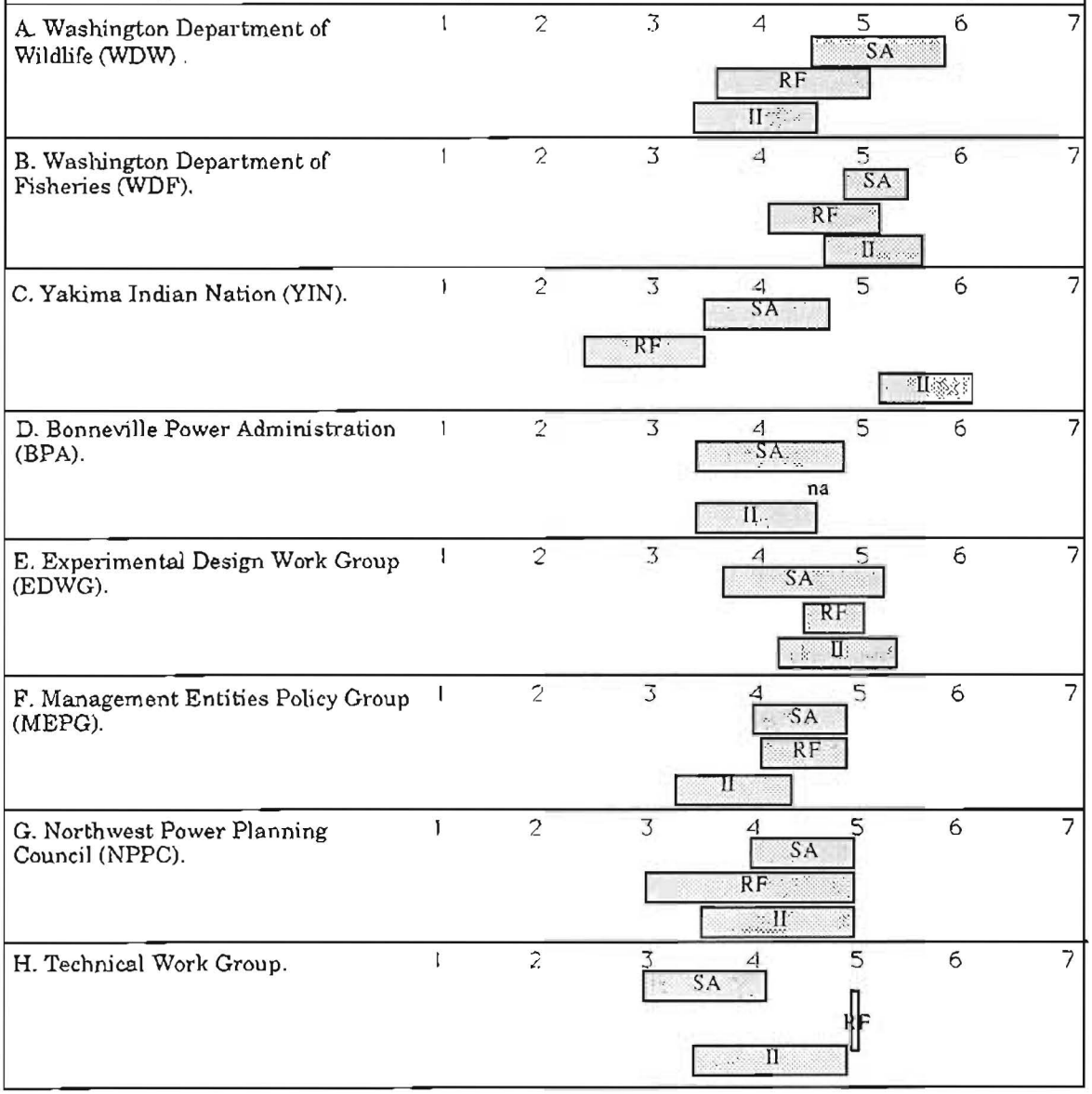
7. Please evaluate the contact & communication you have had so far with the following:	not satisfying not productive	1	2	3	4	5	6	7	very satisfying very productive
					Top bar=Round One. Bottom bar= Round Two				
A. Washington Department of Wildlife (WDW).					1				
					2				
B. Washington Department of Fisheries (WDF).						1			
						2			
C. Yakima Indian Nation (YIN).					1				
					2				
D. Bonneville Power Administration (BPA).					1				
					2				
E. Experimental Design Work Group (EDWG).					1				
					2				
F. Management Entities Policy Group (MEPG).					1				
					2				
G. Northwest Power Planning Council (NPPC).					1				
					2				
H. Technical Work Group.					1				
					2				

Yakima-Klickitat Project, Delphi Survey, Segregated Results

7. Please evaluate the contact & communication you have had so far with the following:

SA= state agencies
RF=ratepayers & funders
II= Indian interests

not satisfying not productive — very satisfying very productive



8, 9, 10. Developing, implementing and enforcing the annual operating plan (AOP). Segregated results show that respondents desire a more significant role for their own agencies, as expected. We initially recommend that agency roles be more clearly defined as they relate to the AOP, with particular focus on assigning to each agency an area of responsibility that meshes with its theoretical project role and practical administrative capabilities. While no clear picture emerges, there is convergence on some aspects of the AOP. Comments and initial recommendations follow.

8A, 8B, 8C. The management agencies. The unsegregated results indicate general agreement that the Washington Department of Wildlife (WDW), the Washington Department of Fisheries (WDF) and the Yakima Indian Nation (YIN) should play significant roles in developing the annual operating plan (AOP).

Segregated results appear to indicate that respondents in the RF category envision a lesser role for the management agencies in developing the AOP, but this may not be the case. In the segregated results for 8D, respondents in the RF category assign to themselves virtually the same numerical value they assign to each of the management agencies in their responses to 8A, 8B and 8C. We interpret this to mean that the funding agency sees itself as an equal participant with the management entities in developing the AOP.

8D. Bonneville Power Administration (BPA). Unsegregated results appear to indicate a preference for BPA to play a lesser role in developing the AOP. Segregated results show that SA respondents, in particular, envision BPA as a minor player in this aspect of the project. Comments suggest that SA respondents are concerned about the possibility of confusing management decisions with funding decisions. This impression is reinforced by reviewing the segregated results for Question 2A. We believe that an effort should be made to clarify any concerns surrounding BPA participation in developing the AOP.

8E. Experimental Design Work Group (EDWG). There is favorable response to the suggestion that EDWG play a significant role in developing the AOP. We interpret this as a recognition of EDWG as a unifying and motivating force in the YK project. We initially recommend that an advisory committee similar to EDWG be considered for inclusion in the organizational design. Attention should be given to the fact that current EDWG participants may assume other roles as the project evolves, precluding their continued participation in EDWG. We feel that attention should also be given to the possibility of including outside, objective experts, similar to the Scientific Review Group (SRG) process currently being developed by BPA.

8F. Management Entities Policy Group (MEPG). There appears to be recognition that developing an AOP is largely a management entities exercise. It is noteworthy that respondents in the RF category are very much in favor of this arrangement. Comments suggest that RF respondents expect the funding agency to participate in developing the AOP by reviewing proposed expenditures. Comments also suggest a higher level of confidence in decisions when management agency representatives come together in the MEPG, as opposed to acting on behalf of their individual agencies. We initially recommend an effort to identify and separate different aspects of AOP development, similar to the the demarcation recommended in relation to 2A, separation of management decisions from funding decisions.

Yakima-Klickitat Project, Delphi Survey, Unsegregated Results

8. How much influence should each of the following have in developing the annual operating plan?

Top bar=Round One.
Bottom bar= Round Two

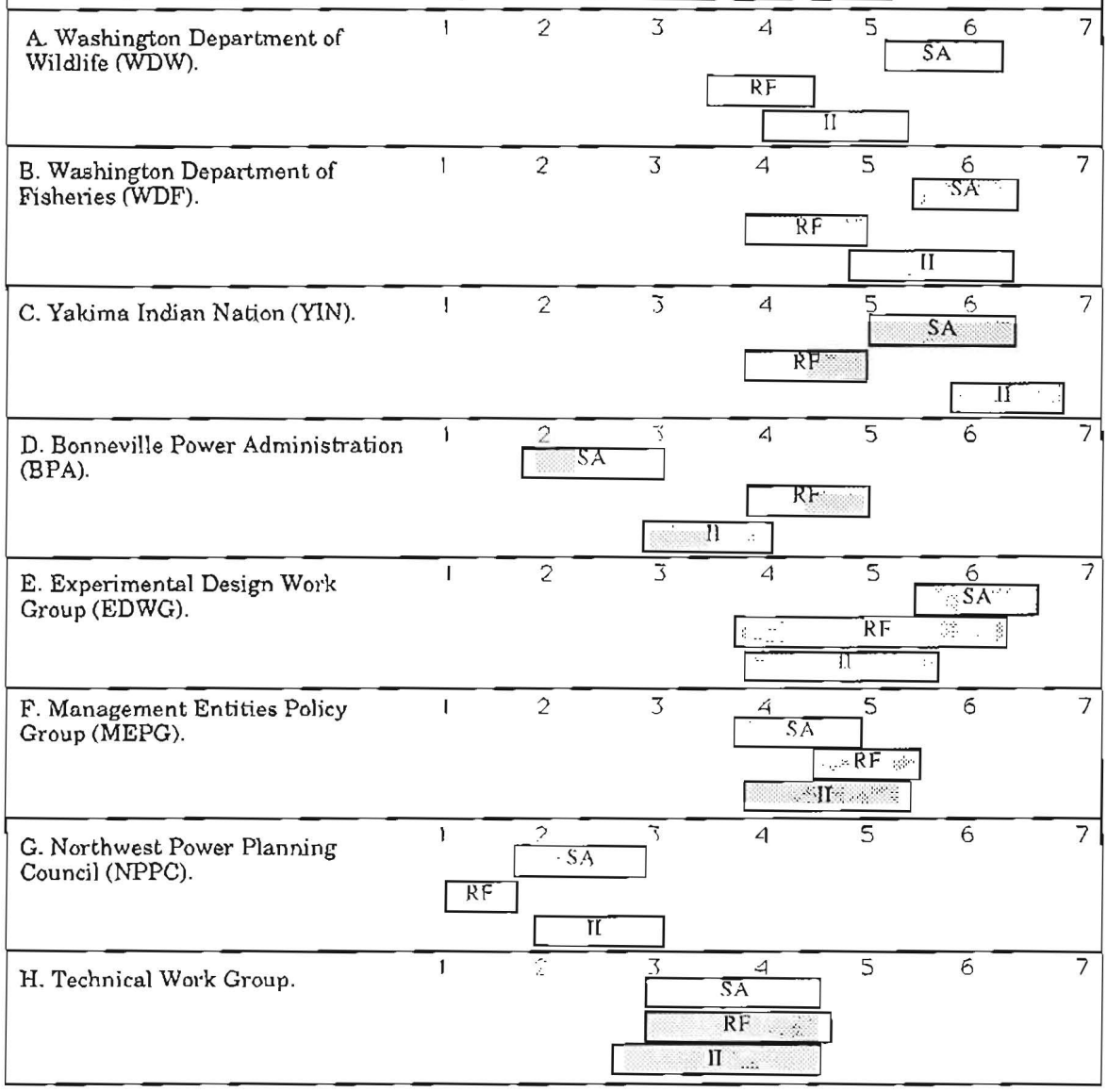
	very little 1	2	3	4	5	6	a great deal 7
A. Washington Department of Wildlife (WDW).					1		
					2		
B. Washington Department of Fisheries (WDF).					1		
					2		
C. Yakima Indian Nation (YIN).					1		
					2		
D. Bonneville Power Administration (BPA).			1				
			2				
E. Experimental Design Work Group (EDWG).					1		
					2		
F. Management Entities Policy Group (MEPG).				1			
				2			
G. Northwest Power Planning Council (NPPC).		1					
		2					
H. Technical Work Group.			1				
			2				

Yakima-Klickitat Project, Delphi Survey, Segregated Results

8. How much influence should each of the following have in developing the annual operating plan?

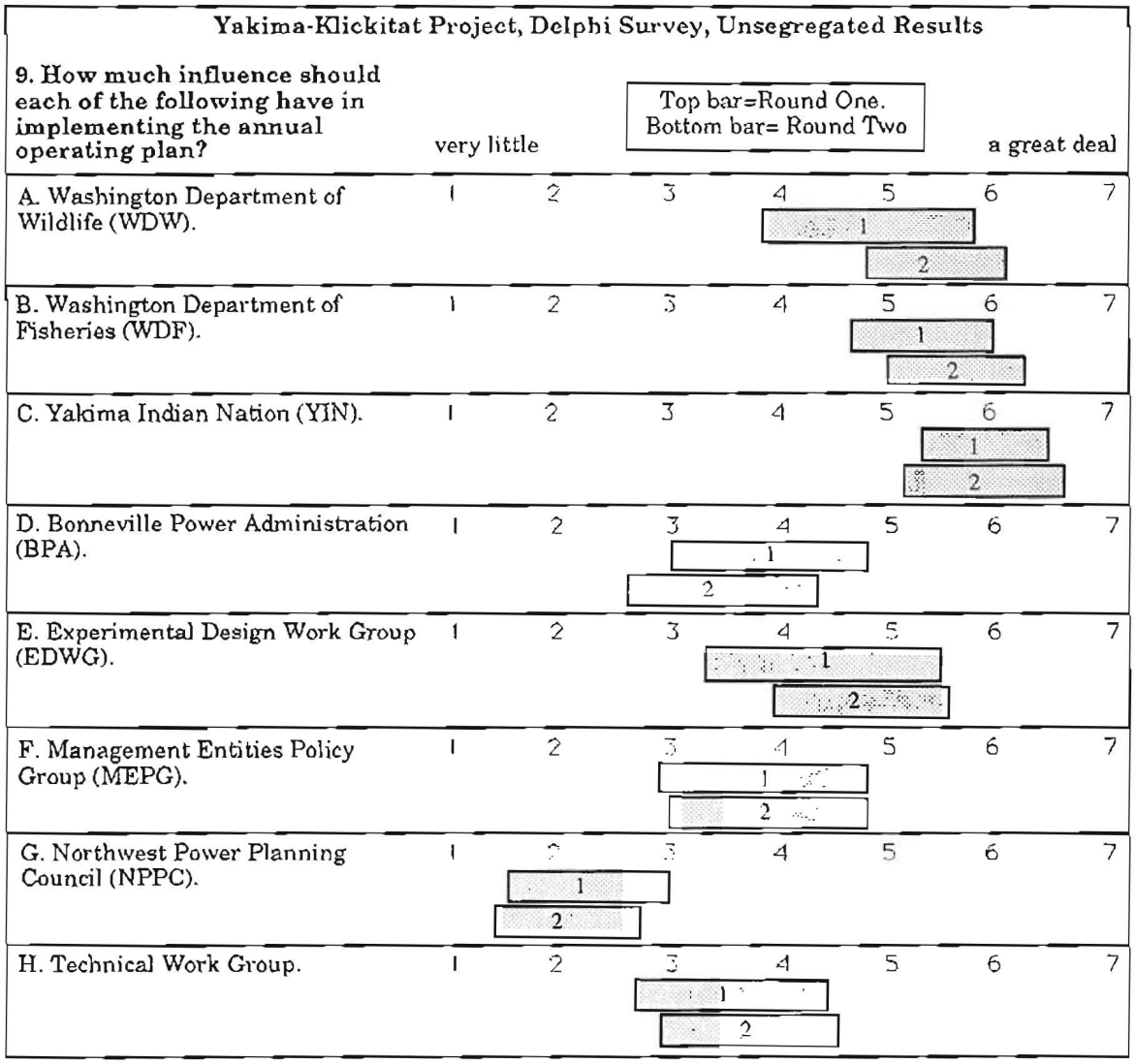
SA= state agencies
RF=ratepayers & funders
II= Indian interests

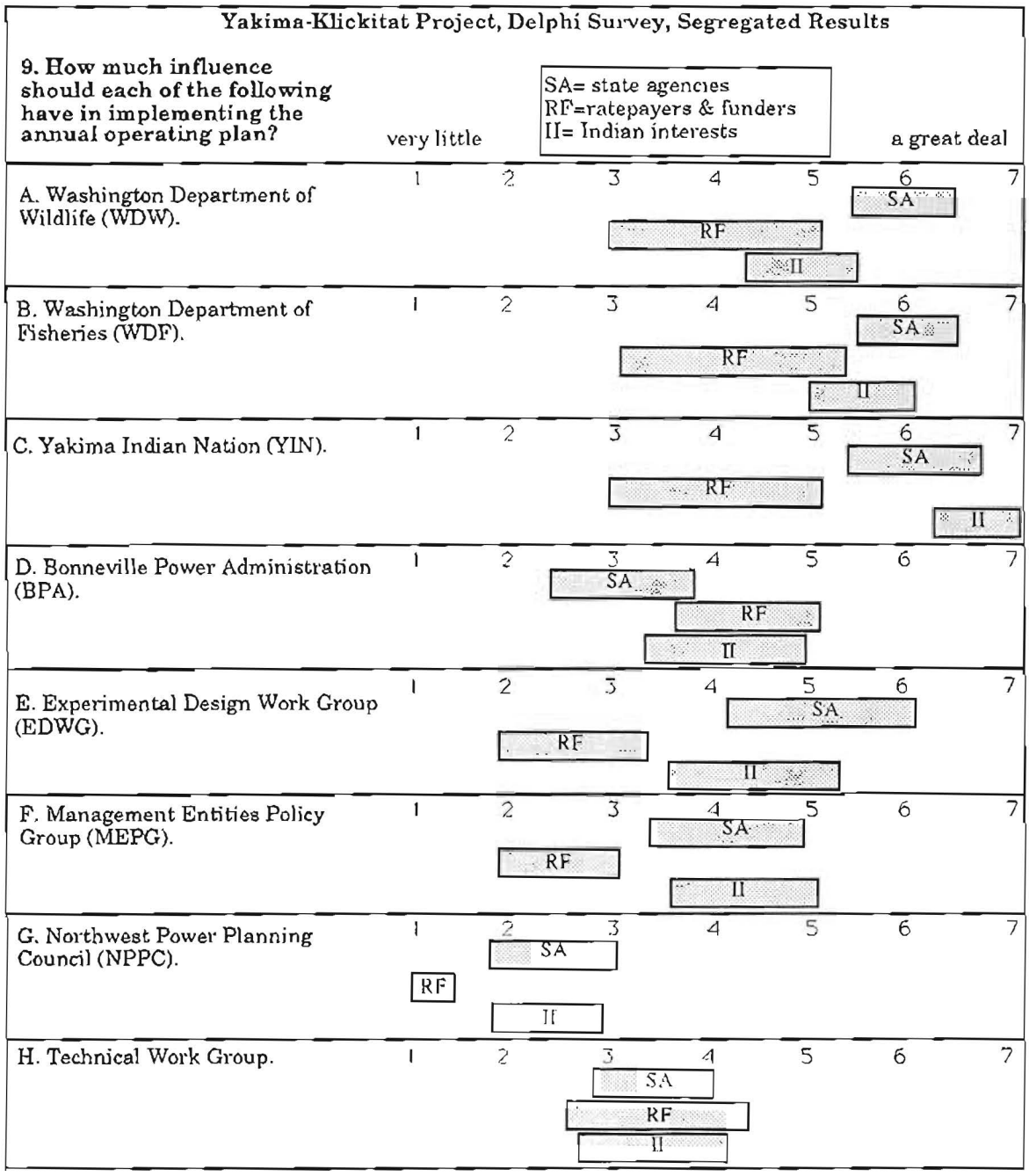
very little — a great deal



9. Implementing the AOP. Unsegregated results suggest that respondents view AOP implementation as primarily a management entities function, but segregated results show a greater diversity of judgements.

Lack of convergence may be attributed to confusion about what it means to "implement" the AOP. Comments reinforce the impression that "implementation" is not universally understood. We initially recommend an effort to define implementation of the AOP by defining and assigning specific tasks associated with AOP implementation. We intend to develop this as part of our continued group exercises.

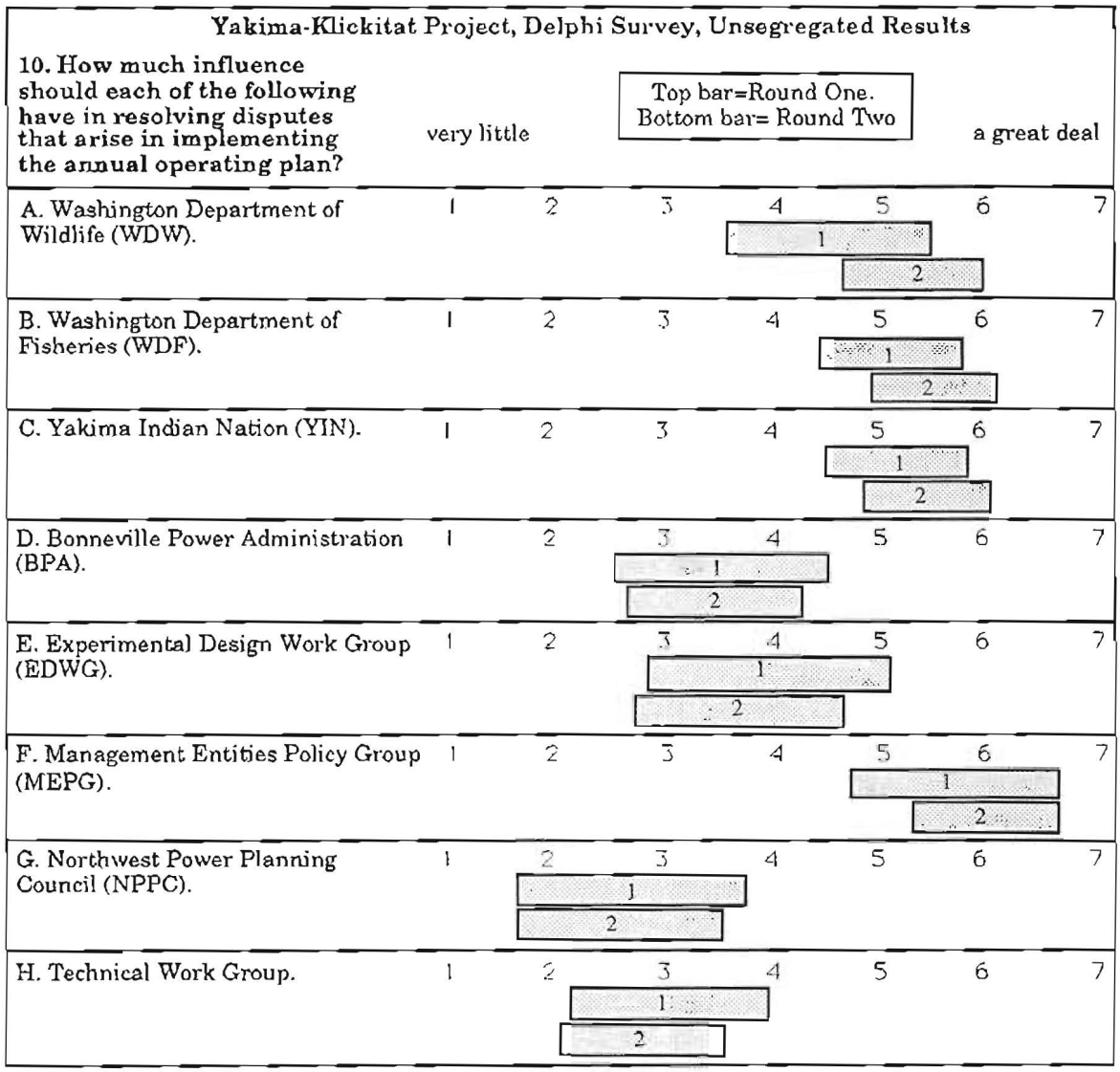



Yakima-Klickitat Project, Delphi Survey, Segregated Results
9. How much influence should each of the following have in implementing the annual operating plan?
SA= state agencies
RF=ratepayers & funders
II= Indian interests
very little
a great deal
A. Washington Department of Wildlife (WDW).
B. Washington Department of Fisheries (WDF).
C. Yakima Indian Nation (YIN).
D. Bonneville Power Administration (BPA).
E. Experimental Design Work Group (EDWG).
F. Management Entities Policy Group (MEPG).
G. Northwest Power Planning Council (NPPC).
H. Technical Work Group.
1
2
3
4
5
6
7
SA
RF
II

10. Dispute resolution. There appears to be agreement that dispute resolution ought to be done as a cooperative management function. This seems to be more acceptable to the respondents than giving any individual agency a dominant role in the process. We initially recommend adopting a specific dispute resolution process, perhaps by adapting a process that has been proven to withstand administrative and legal appeals.

Segregated responses to 10E provide an example of confusion about the continuing role of EDWG in the project. SA respondents appear to have a very different preference than other respondents. Also noteworthy is the length of the bar for the RF category, indicating a diversity of judgements among respondents in the RF category.

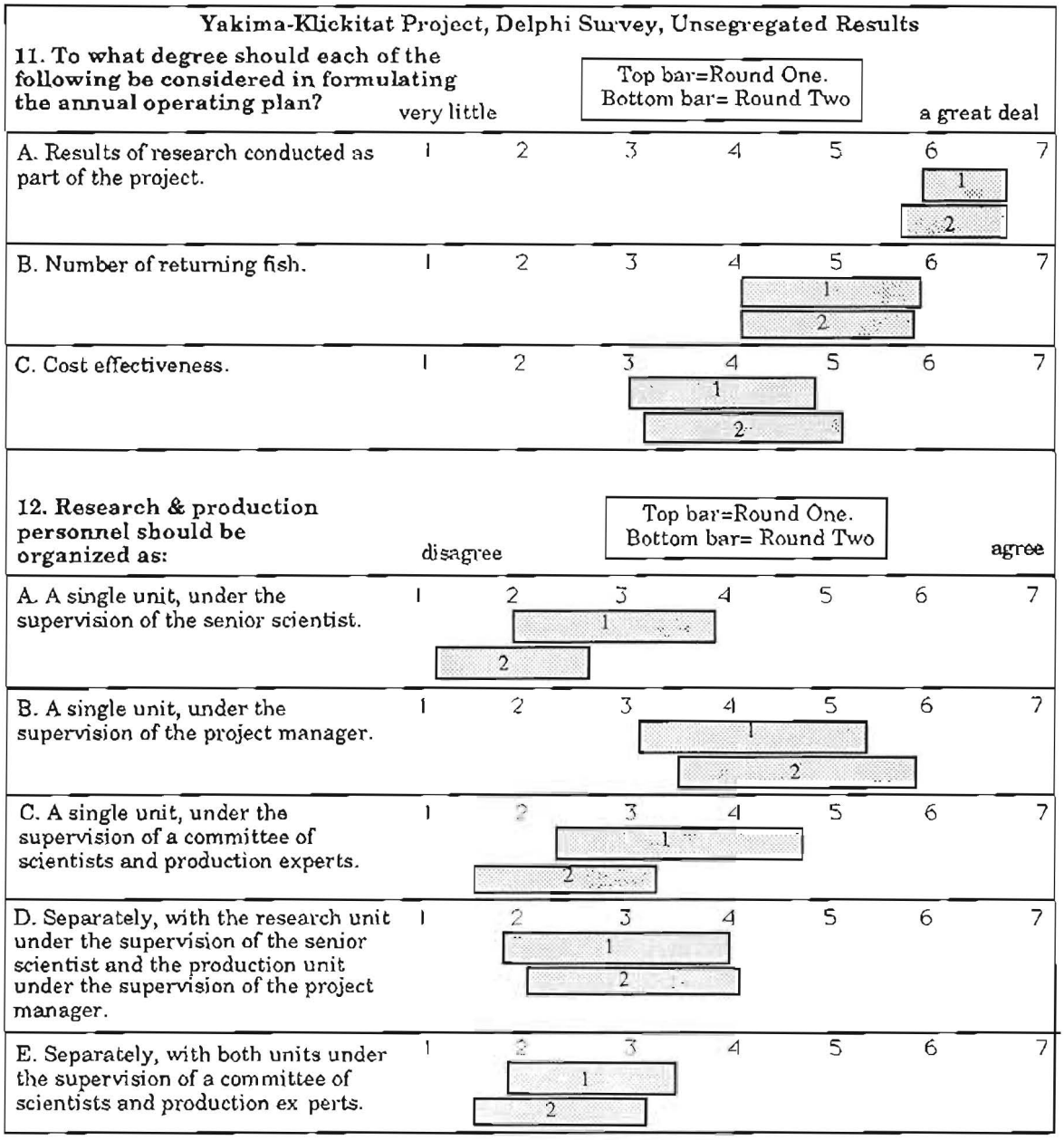
Unsegregated and segregated results indicate a definite preference for assigning this function to the MEPG, as shown by responses to 10F.



11. Adaptive management. This question is designed to measure the appreciation of adaptive management. As with the question about project goals, there appears to be consensus that monitoring & evaluation and production results should be incorporated in AOP design. This is borne out by examination of unsegregated and segregated results.

Segregated results suggest that respondents in the RF category promote cost-effectiveness by their favorable response to 11C. We initially recommend that an adaptive management design be developed, much the same as an experimental design is being formulated.

12B. Project manager. Although this question appears to ask about several different organizational possibilities, the pattern of responses makes it a mandate for a project manager. There seems to be recognition that a project manager is desirable. We attribute this to the perceived need for an identifiable locus of responsibility. Our exercises to hire the hypothetical "top box" tend to confirm this, with special emphasis given to general administrative talent. We initially recommend that the management entities and the funding agency consider a cooperative effort to find a project manager, with particular attention paid to administrative skills.


Yakima-Klickitat Project, Delphi Survey, Unsegregated Results
11. To what degree should each of the following be considered in formulating the annual operating plan?
Top bar=Round One.
Bottom bar= Round Two
very little
a great deal
A. Results of research conducted as part of the project.
B. Number of returning fish.
C. Cost effectiveness.
12. Research & production personnel should be organized as:
Top bar=Round One.
Bottom bar= Round Two
disagree
agree
A. A single unit, under the supervision of the senior scientist.
B. A single unit, under the supervision of the project manager.
C. A single unit, under the supervision of a committee of scientists and production experts.
D. Separately, with the research unit under the supervision of the senior scientist and the production unit under the supervision of the project manager.
E. Separately, with both units under the supervision of a committee of scientists and production ex perts.

Yakima-Klickitat Project, Delphi Survey, Segregated Results

11. To what degree should each of the following be considered in formulating the annual operating plan?

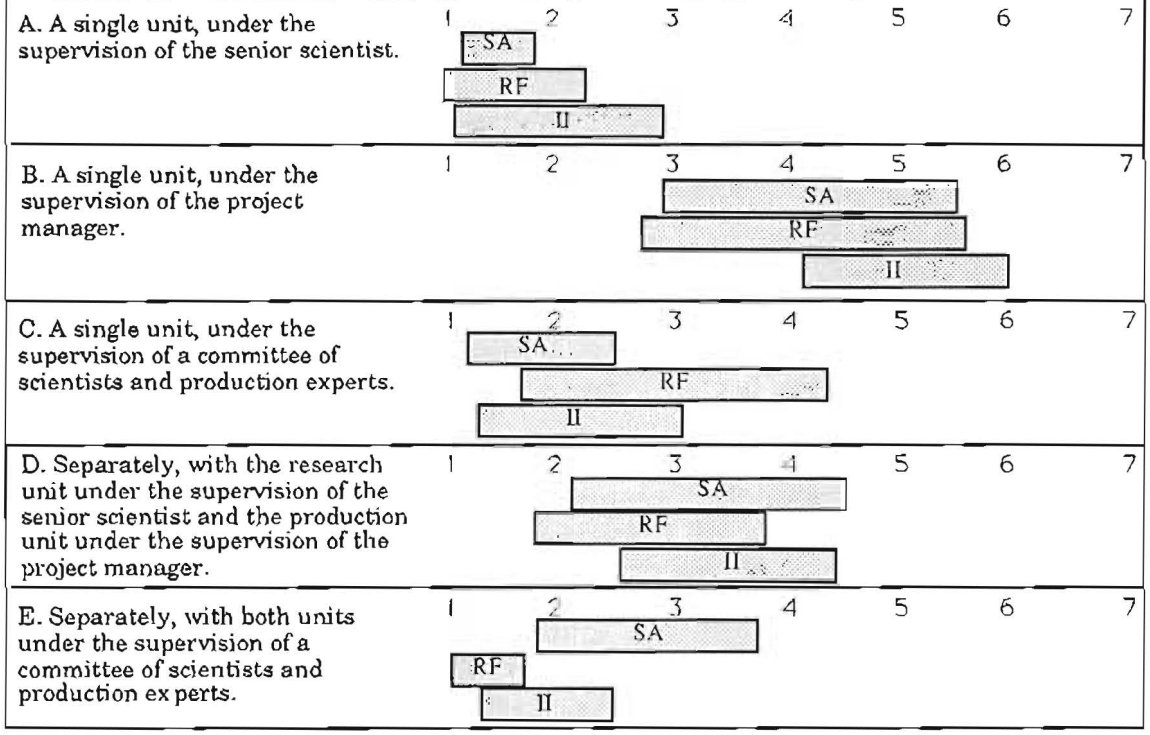
SA= state agencies
RF=ratepayers & funders
II= Indian interests

very little — a great deal

12. Research & production personnel should be organized as:

SA= state agencies
RF=ratepayers & funders
II= Indian interests

disagree — agree

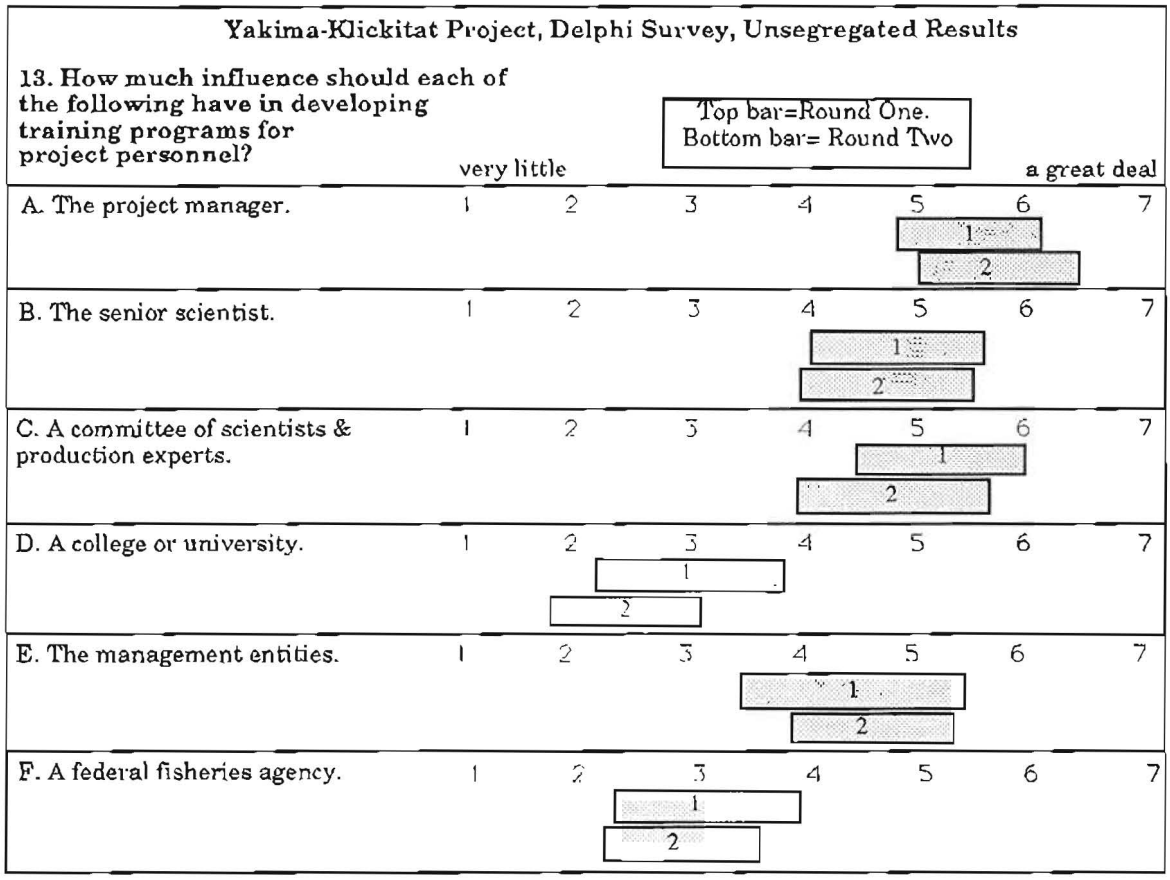


13A. Project manager. As with question 12, this question points out the fact that respondents expect the project manager to be pivotal in accomplishing the major functions of the project.

13B, 13E, 13F. Segregated results reveal that respondents in the RF category tend to prefer that developing training programs be assigned to a federal fisheries agency, rather than the senior scientist or the management entities. We attribute this to two factors, based on comments. First, funding agency respondents express concern that training will focus too much on generalized research, and not enough on practical aspects of the project. Second, the funding agency prefers to handle training by contracting, and it has previous experience in contracting for training with federal agencies.

13D. No more players. The responses to this question could be interpreted as mistrust of universities, or we might infer something about our own credibility, but we attribute the responses to a desire to limit the number of agencies and entities participating in the project. Given the fact that complexity is already perceived as a problem, we recommend that this preference be respected, at least in the short term. As the project moves toward full operation, consideration may be given to involving agencies or institutions or corporations with additional capabilities. We assume project participants realize that they cannot provide internally for all the capabilities that the project is likely to require in the future.

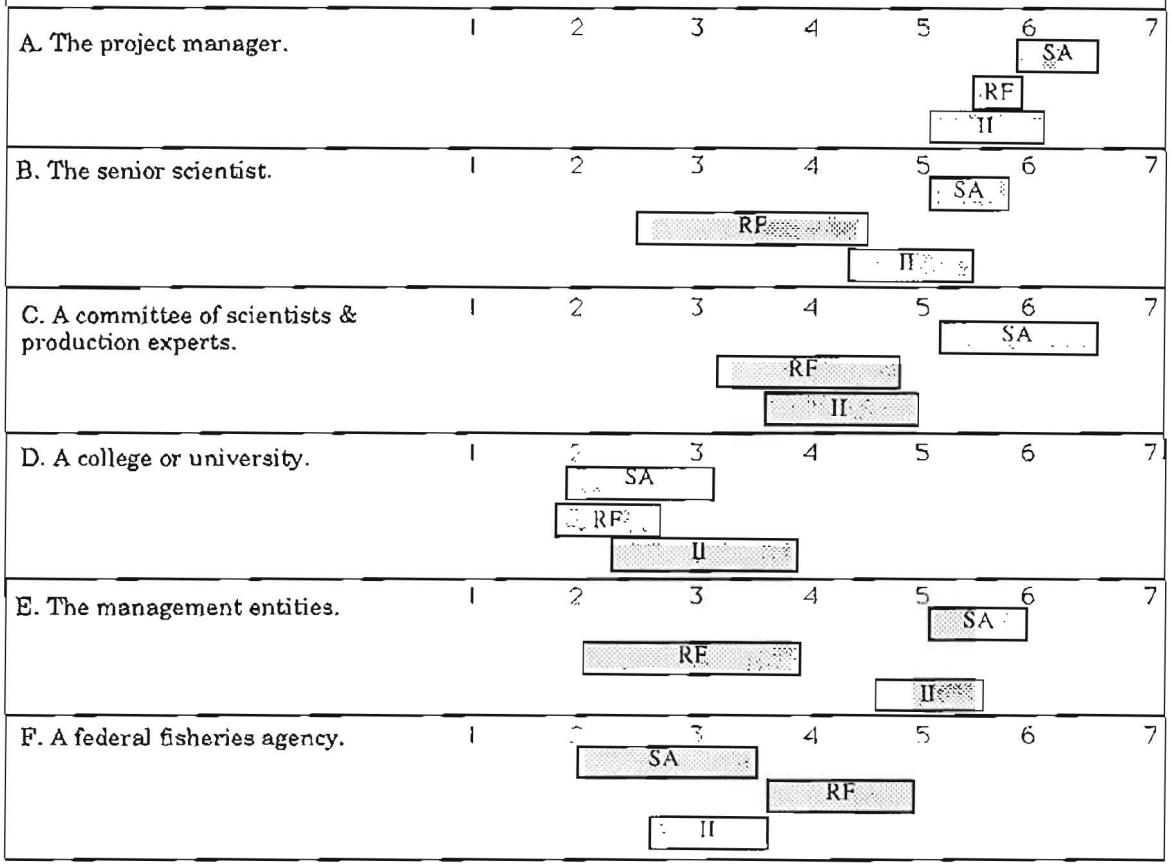
Yakima-Klickitat Project, Delphi Survey, Unsegregated Results



Yakima-Klickitat Project, Delphi Survey, Segregated Results

13.How much influence should each of the following have in developing training programs for project personnel?

SA= state agencies
RF=ratepayers & funders
II= Indian interests



Yakima-Klickitat Production/Supplementation Project
Administrative Design Group

Delphi Survey Results - Comments

This is a collection of comments from Round Two of the modified Delphi survey conducted by Portland State University as part of the administrative design for the YKPP.

Not every comment is included in this report. Comments from Round One adequately identified problem areas, and only comments that suggest approaches to identifiable administrative issues are included here. Comments are categorized by the issue to which they relate.

Many comments have been extensively paraphrased, to assist in maintaining confidentiality.

Some comments may appear in more than one category when they appear to relate to more than one issue. For this reason, the summary of comments is not an accurate picture of the popularity of a particular professional judgement, nor does it accurately reflect the distribution of responses.

Comments are presented to stimulate constructive discussion concerning project issues, and we have selected some of the most creative to include here.

Adaptive management.

The project will be a prototype for other production programs in the Columbia Basin and elsewhere, if it works! Otherwise, it will serve as evidence of society's commitment to try a new approach, and learn from it. The scientific community at large will respect the intent of the project to do a better job of monitoring & evaluation and pre-planning, even though the value judgements pertaining to dollars may not be entirely accepted.

The project should explore the idea of quality circles or some similar process to allow information to modify what goes on i
n day-to-day management decisions.

I agree with the statement that numbers of fish should be subordinate to learning through adaptive management. As we learn more about supplementation, numbers of adults produced will increase as a result of research and adaptive management.

Annual operating plan (AOP).

What is the AOP? I assume it is the experimental design plan. The AOP should be developed by EDWG and reviewed by the MEPG before implementation. The NPPC should ensure input on coordination and integration with basinwide issues, as appropriate. The funding agency should assist when funding constraints force difficult decisions. The TWG plays a major role in developing the AOP. Implementation of the AOP should be done by the agency operating the hatchery, with direction and guidance by EDWG.

The funding agency will be involved with the management entities in developing the AOP. The facility operators will implement the AOP. The managers will provide policy input. The funding agency will ensure compliance with provisions of the AOP.

Since supplementation is a dominant project purpose, EDWG should develop the AOP in direct consultation with the fish culture staff. BPA should comment to MEPG, particularly relating to funding constraints, but final approval should rest with MEPG and be based on consensus between the management entities. No management entity should have a "super majority" or excessive influence. The project leader should help negotiate differences within MEPG, so a consensus can be reached and a unified position be projected to the public and project participants.

The project manager will work closely with EDWG in developing and implementing the AOP.

The AOP must be a consensus document, with consensus including the funding agency. This might require a lot of give and take between the management agencies and the funding agency, but it might be good for everyone's administrative abilities if they had to work through a process and come to a definite conclusion.

An inter-agency group should develop the AOP. What the group is called doesn't matter. Right now, it is called EDWG.

Implementation means putting into action that which has been approved.

There should be little need for dispute resolution if the AOP is developed adequately.

Appropriate technology.

State-of-the-art specifications mean progressive approaches to water use, broodstock collection, spawning guidelines and release protocols. All of these practices will add elements of cost and inefficiency not usually found at standard production hatcheries. the main point is that "success" is not driven by just economic considerations. Genetic aspects of the program will necessitate high costs and inefficiency. Some "conventional" practices, unfortunately, are still "state-of-the-art." State-of-the-art specification doesn't involve facilities or machines; it involves thinking!

Construction and operation should be as per existing hatcheries, with the experimental component integrated in the process. We have the opportunity to take the best from existing programs and add research requirements unique to this effort.

Generally speaking, the project should abandon traditional hatchery practices, although some existing practices should be used. Best management practices (BMP) exists for fish culture in the actual production of hatchery fish, but BMPs do not exist for utilizing the product of the hatchery for supplementation.

The project should use the best proven technology and operating practices. I am nervous about relying too much on automation. Well trained fish culturists who adhere to carefully written SOPs that include proven technologies and management practices is a better way to go. However, this is a research project and the best methods for supplementing natural runs is yet to be determined. This aspect of the project must remain flexible and subject to adaptive management.

Quality assurance is the highest priority. We must be able to control variability and reproduce results. This will require standards and procedures, which tend to benefit from automation.

A high degree of automation might violate NPPC instructions to keep costs low. The feasibility report includes duplicating existing technology, down to hand feeding.

The production facilities proposed for this project are similar to the Chelan PUD Rock Island central/satellite complex, which was designed in accordance with current WDF standards. The emphasis is on low density and good water supply to produce healthy fry and smolts. No automated, gold-plated facilities are proposed.

Cost efficiency.

Elements of the project have inherent inefficiencies and costs which are higher than those encountered by traditional production hatcheries. These costs are due to the need to learn, and due to operations which are inherently less efficient, but have a greater chance of conserving genetic resources.

The Columbia River Treaty Tribes worked very hard to ensure that cost effectiveness is not used to evaluate fish enhancement alternatives. This led to the placement of almost all mitigation for salmon losses due to hydroelectric dams, providing few benefits to those who lost the most.

As trust resources, the salmon are priceless, and have a higher non-dollar value than does electricity.

Cost effectiveness formulas can't really apply to this project, due to its unusual nature and the impossible task of assigning a dollar value to testing the supplementation idea. Even so, the funding agency needs some opportunity to contain costs. This would also be to the benefit of the entire project, since runaway spending causes confusion and loss of direction.

Adaptive management based on research findings is the name of the game. Research is the answer if it includes cost considerations.

The funding agency is responsible to the government and ratepayers to meet fisheries goals in a cost effective way. The first stage screening project in the Yakima Basin was no less complex than the YKPP.

Experimental Design Work Group (EDWG).

Participants work well together under stress. The group seeks common goals and attempts a progressive approach to problem solving and consensus building. Funding security for EDWG member participation has been instrumental in its success to date.

EDWG has been crucial to the progress we've seen so far. My guess is they'll be just as important in the future. Will the people who now sit on EDWG be able to continue in the future, or will they be forced off EDWG as they assume other roles?

Having worked many years in hatchery operations, I'll say EDWG has individuals who relate to hatchery production better than any I've seen. They compromise pretty well.

Funding uncertainties.

Funding uncertainties are those of another agency, not my own. These uncertainties, combined with disagreements between agencies, hamper progress.

Funding uncertainties may be perceived as a problem, but the project is a high priority for the funding agency, and has never been adversely impacted by budget constraints. Once contracts are executed, compliance with agreed-upon provisions is not optional, but mandatory according to Federal Procurement Policy.

A lot of uncertainty about funding could be cleared up if all the agencies understood more about the budget process in general and the funding agency budget process in particular. Both sides of the process need to sit down together and examine the process without having a pending request on the table. Somebody in one of the organizations must understand budgeting in general, and not just from his or her own agency perspective.

When costs exceed initial estimates, funding uncertainties occur. The project needs to be able to make accurate initial estimates of management alternatives, then stick to them.

Harvest management.

The YIN will not unilaterally determine how new production will be utilized. There are two state co-managers (WDF & WDW) who also have a voice regarding harvest management, and there is U.S. vs. Oregon as a constraint.

The public (sport and tribal) wants additional opportunities to harvest fish. these opportunities must be provided if the project is to be judged a success from the public point of view.

Harvest management is not done by the project, even though information may be used by several different sides in a harvest dispute. The project needs fair guidelines to ensure that it doesn't restrict information to one party in the negotiation process.

Harvest should be minimal in order to allow escapement required to test supplementation principles.

Information flow and communication.

Communication and information flow from policy people to technical people should be emphasized, as well as improved information exchange among technical groups as research activities are implemented.

Communications have improved greatly in recent weeks. When people get down to business, the communication process will improve more.

This diverse group of professionals will have to learn to communicate effectively and work together as a team.

Maybe the project should hire an information specialist, somebody whose job it is to ensure that the right hand knows what the left hand is doing.

Information and communication networks are defined as formal vs. informal, internal vs. external. Policy people and staff people need to study this and know how their own networks link up with those of other agencies. There needs to be some effort to mesh.

A calendar of upcoming meetings, hearings, etc. could be sent out every week or two.

Inter-agency coordination.

Some participating entities have not been conscientious about ensuring that policy representatives attend public meetings and interact with technical people. In some cases, policy workload is transferred to technical staff people.

Clearer definition and explanation of policy objectives and the roles and responsibilities of participating agencies would be a great benefit. This should be put in writing. This would reduce misunderstanding, resentment and squabbling.

Management-funding separation.

The Power Council and the funding agency should determine an annual funding limit, and the MEPG should make all management decisions without threat of interference by the funding agency. The funding limit would reflect funding constraints and allow MEPG to select from a range of management options imposed by the funding limit. The funding agency should have an advisory role to MEPG in selecting from management options.

There needs to be better distinction between funding and resource management roles. The funding agency is not a resource management agency. If these roles are separated, some of the "obstructionist" comments will fall away.

The Power Council gets its funding from BPA. Maybe the project should look at their budget process and use something similar. Perhaps there is some administrative or professional relationship between NPPC and BPA that we could adopt.

Management and funding decisions go together; one acts as a check on the other. It seems reasonable that there should be some constraint on funding, or ill-conceived and possibly expensive management decisions may occur.

Management and funding decisions cannot be separated in the end. Managers have to respect spending constraints.

Organizational arrangements.

It is absolutely essential that an operating entity be created and chartered by the state and the Yakima Indian Nation. If this issue is allowed to drift into a question of which agency will operate the project - state, federal or tribal - it may become very divisive and confrontational. To avoid this, a new entity that is independent of the state and tribe should be created to operate the project. This entity would have to be created within the next six months, since the question of an operating entity must be addressed, and those interested in the project, both public and private, informed as to the institutional arrangement. The importance of the operating entity cannot be overstated.

The project manager should be hired by and report to MEPG. The project manager will work closely with EDWG in developing and implementing the AOP. The senior research scientist and the production facility managers will supervise their subordinates and report to the project manager, who will resolve conflicts between research and production, based on the AOP and guidance from MEPG. The MEPG would respond directly to the project manager on policy issues, after being briefed by EDWG.

Project staff should be housed together, regardless of agency affiliation.

The project should employ a matrix approach to management.

The adaptive management concept could be applied to building the project organization. At first, most duties might be contracted out, with reshuffling done according to evaluation of the results. Keeping the organization flexible over time seems to be an advantage.

WDF hatcheries are programmed through a highly interactive program planning process which minimizes problems and gives interested parties "ownership" by providing opportunity for input that is appropriate to a particular area of responsibility. There is review and input on program plans before they are implemented. Managers and technicians at several levels have the opportunity to make sure that their needs are met. The YKPP mission should be explained up front, so that all parties understand it an agree with each aspect of it, including the decision making process. The project should seek assistance from others where necessary.

I am a firm believer in team building on projects, so that the team has multidisciplinary skills and knowledge to accomplish the job.

Policy definition.

It appears that EDWG lost time because they did not receive policy direction on some issues -- how, when and where coho would be used in the basin, for example. It is not clear if the policy group changed their position on coho over time, or failed to communicate their decisions to technical people.

There is lack of attendance by policy review people and lack of familiarity with some of the issues on the part of policy people. Agency staffs need to brief policy representatives, who need to do homework on the issues. The same policy representatives should participate over time to promote continuity. Flexibility and decision making authority should be given to policy representatives. The MEPG should be given more attention by participating agencies. Policy difficulties are not unique to the YKPP.

I would like more contact with my agency's policy representative, to help define the boundaries of my participation. I am operating somewhat on my own initiative, attending meetings when I am asked to by my technical peers from other entities, or if I think I have something to contribute, or if I feel I should participate to advocate issues connected with my role in my agency.

Policy makers from the participating agencies should set up a regular, consistent process. They should identify problems, expectations and needs ahead of time by communicating directly with each other and through their staff people. They could develop alternatives for solutions independently, as long as they let their counterparts in on what they were doing. Then, when they came together, choosing the best alternatives would be much easier.

Clearer definition and explanation of policy objectives and the roles and responsibilities of participating agencies would be a great benefit. This should be put in writing. This would reduce misunderstanding, resentment and squabbling.

Policy makers need to be better informed. Staffs need more resources and more focus on communicating concepts, especially technical concepts, to policy people.

Project purposes.

Preserving traditional Indian culture is not a stated purpose of the project, nor should it be. However, if the project is successful and produces more anadromous fish, traditional Indian culture based on fishing fishing may be strengthened. A lack of fish today threatens that aspect of their culture.

Roles of participating agencies.

It's time for a re-statement of roles and responsibilities of each participating agency, and who is going to operate and manage the project facilities. The comments on this survey indicate that the idea of cooperative co-management may not be accurate.

There is too much emphasis on roles. Common goals, objectives and purposes need to be defined, so that the participants can commit to them. Common goals should be constructed on the needs of the participants and what they can contribute to the success of the project.

Salary & work environment.

Some of the office work environments associated with the project present an unprofessional image, even though staff dedication is admirable.

I agree with the statement that salary parity between the management entities, particularly at the technical level, would boost morale. Pay should be equal for equal levels of work or responsibility.

Task assignments.

Participating entities should commit to doing work only if they are confident they can and will comply with contract requirements.

The project manager should be a good administrator and supervisor, preferably with technical background in fish culture and research methodology.

The senior research scientist and the production facility managers will supervise their subordinates and report to the project manager, who will resolve conflicts between research and production, based on the AOP and guidance from MEPG.

Duties and responsibilities should be assigned according to capabilities of the agencies. This means that participants honestly assess their own abilities, and not give in to political pressure or unrealistic expectations of who should

do what. This might be helped by keeping some options open, and not deciding that a particular agency would play a particular role forever.

The project manager should work with EDWG, the senior scientist and facility managers to define minimum qualifications for research and fish culture personnel. This group should develop training programs to "indoctrinate" personnel about project goals and objectives.

Training & education.

I agree that the project should not be a training ground any more than most employers train workers. Staff positions should be filled with qualified people who can be trained (OJT) for promotional opportunities. The staff should be trained already, not by the project. the experimental aspects of the project necessitate a strong technical/scientific background and appreciation. If training is required for even entry-level jobs, then one might presume the project is trying to preserve employment opportunities for tribal members only. The project should be staffed with the best candidates available at large.

USFWS should be involved because it has formal training programs.

I assume the involvement of personnel outside the project is for the purpose of transfer of knowledge, and not to train people outside the project.

Project personnel should be trained before they are hired for the project. What we are discussing is "continuing education" to help insure that well trained people are in the program.

Facility operators will have to be trained to properly operate this unique facility. Even assuming that "hands on" fish culturists have extensive training and experience, they will have to un-learn some things . Since the project is supposed to research supplementation for the entire Columbia Basin, it is appropriate to include training at similar projects.

Personnel hired for various project functions should come to the job with the appropriate formal training and experience, but should be prepared to re-train or re-learn their skills to mesh with the unique character and objectives of the project. This diverse group of professionals will have to learn to communicate effectively and work together as a team.

The project manager should work with EDWG, the senior scientist and facility managers to define minimum qualifications for research and fish culture personnel. This group should develop training programs to "indoctrinate" personnel about project goals and objectives.

Training for YIN personnel should be funded by the project, since the YIN does not have the financial and personnel resources as do other state and federal fisheries agencies.

The project has a responsibility to transfer new knowledge and experience, both scientific and operational, to the rest of the Columbia Basin. Opportunities should be provided to share experience with others in the region.

The project requires a diverse staff. Not everyone needs to possess all skills.

Participation in professional organizations such as AFS and participation in conferences should be encouraged.

I like the idea of training programs and workshops for other management biologists. Since the information gained here is to be used throughout the Columbia Basin, our experiences should be well known by others who will use these techniques.

Training and education programs should involve more than local authorities, to avoid a loss of broad perspective, developing shared assumptions, and erosion of creativity and innovation in problem solving.

YAKIMA-KLICKITAT PRODUCTION PROJECT

ADMINISTRATIVE DESIGN GROUP

APPENDIX C

GROUP DYNAMICS

YAKIMA-KLICKITAT PRODUCTION PROJECT
ADMINISTRATIVE DESIGN GROUP

REPORT ON GROUP DYNAMICS

We want to thank all of the participants for the contributions they made in developing a description of the YK Project objectives and tasks. Our goal is to help design the administrative arrangements you would like to see in the design, construction and operation phases of the YK project.

Our research approach to meet the Power Planning Council's administrative design requirements for the YK Project involves gathering information from the current project participants and those who have knowledge and relevant experience with anadromous fish supplementation. The first two research techniques of the project, literature review and extensive personnel interview, are what we call the "head weighing" processes. "Head counting" occurs in the third research technique, which is the Delphi process, using written questionnaires. The fourth research technique is the "head shaking" process, involving group dynamics exercises such as those on February 26 and March 2.

As you may have noticed, there is some repetition involved, since one research technique supports and verifies another. Information gleaned from surveys and interviews may contribute content to the group dynamics exercises. Conversely, information revealed in group exercises may determine questions asked in personal interviews.

In introducing the tasks for the group dynamics discussion, the PSU team set forth a brief summary of the conclusions that they had reached in their work so far.

I. First, we need to have clear understanding of the supplementation technology development process. A common view of the technology development process is that it proceeds in a sequence - research laboratory investigation, bench testing to verify laboratory results in an applied setting, full scale application, and generally accepted use. (see figure 1)

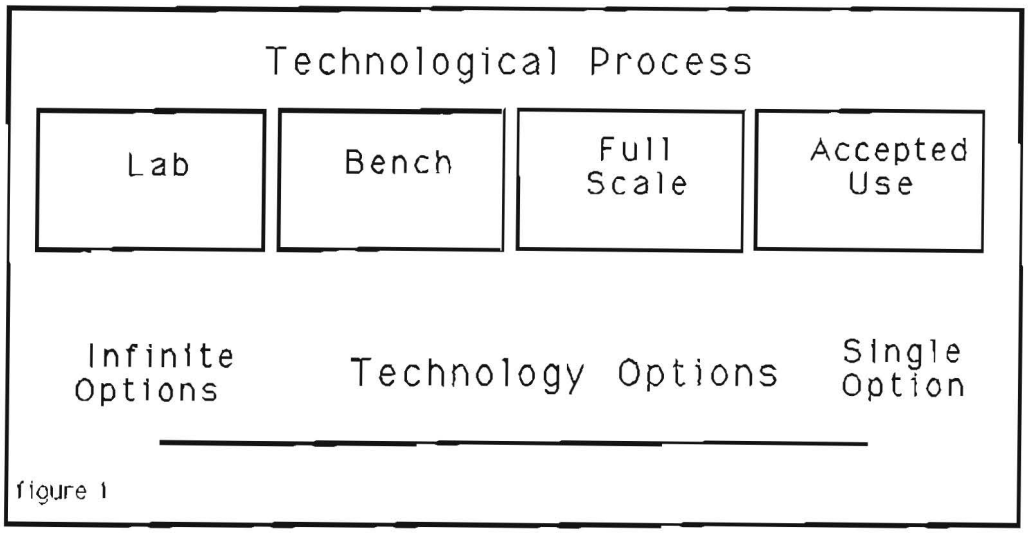


figure 1

In the YK Project we are testing by full scale application (phase 3) of a supplementation technology that has emerged from laboratory and bench testing results. As the technological process moves into its final phases, options are eliminated. The YK project already has completed many of the research tasks connected with the adoption of a new technology, including the experimental design, preliminary architectural design, and fish production schedules. As we move into phase 3, our primary task, in addition to production, is to monitor and evaluate the application of this technology in its full scale application. As you can see from the diagram in figure 1, the choice of technology options declines, as does the scope of the research effort.

Thus, the remaining research needs are limited to design of the monitoring and evaluation methodology for supplementation and production, design of appropriate data systems, analysis of the monitoring data, and the ability to transmit the research results into the YK project production process and into the external scientific and fish production learning processes.

An important aspect of the full scale application phase is the demonstration objective. This requires transmission of information not only back into the YK organization but to other sub basin entities in the Columbia Basin and to the national scientific community. Thus, there is need for not only an internal organization learning process, but external learning as well.

II. A critical part of applying a new technology is to carefully look at the manpower and training needs in the development and implementation phases. Levels and type of supervision and training requirements will be influenced by task complexity, geographical distribution of tasks, whether the tasks are repetitive or consecutive, and whether tasks are essentially intellectuals or non intellectual. In Figures 2A and 2B, we illustrate how YK supplementation differs from hatchery management in two important respects.

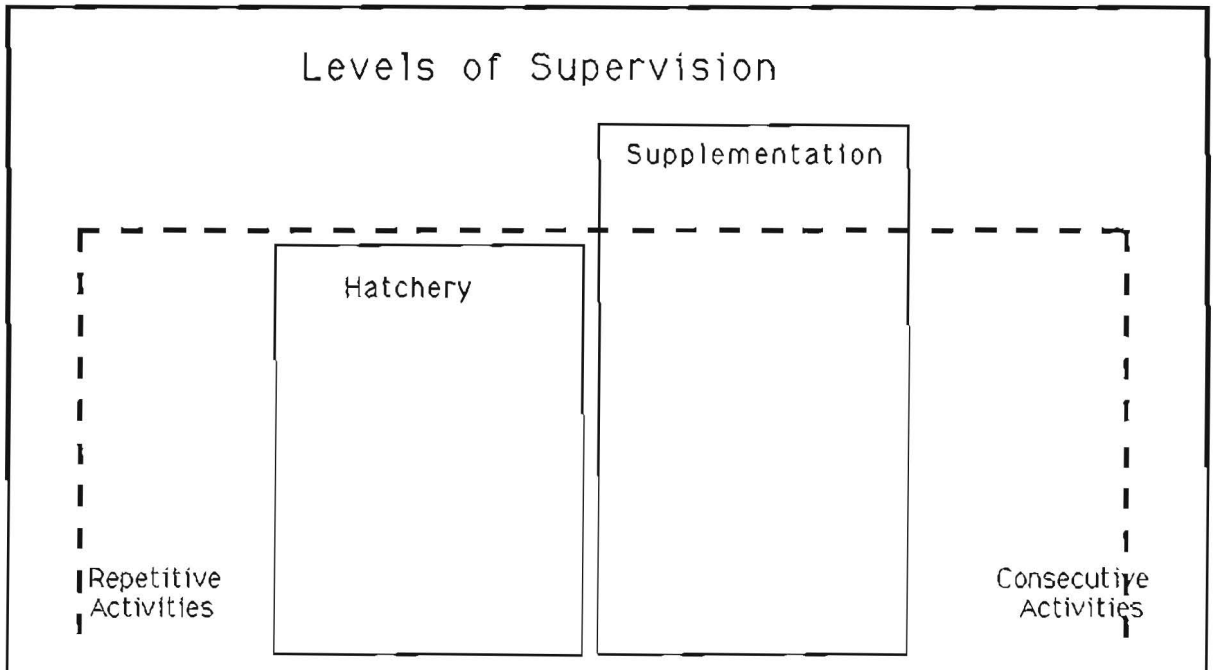


figure 2A

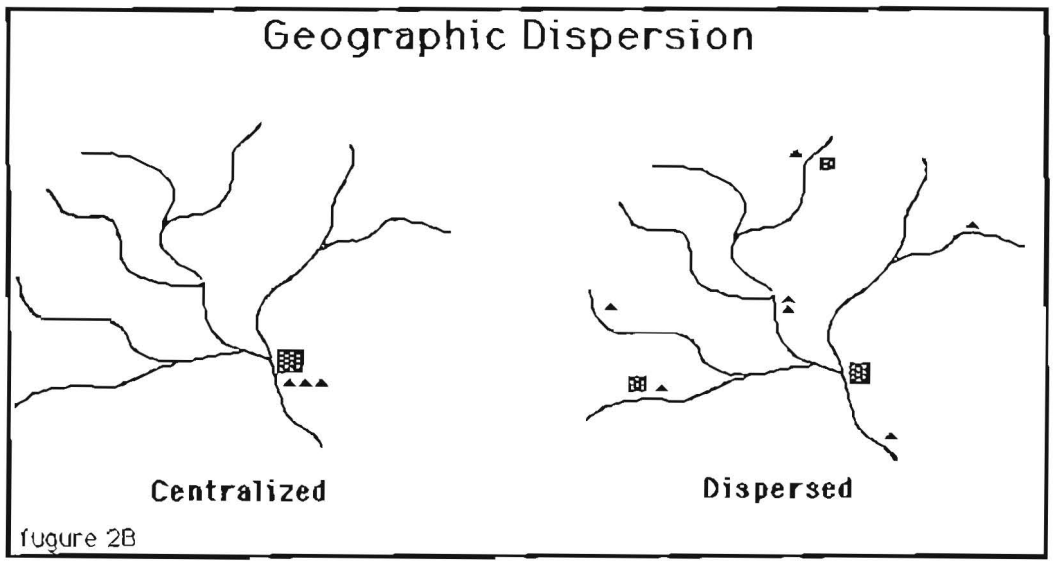


figure 2B

III. Managing an uncertain production function or adaptive management is one of the major issues involved in organization design. For our purposes, adaptive management encompasses the notion that we are designing a production function for a biological process where the outcome is highly uncertain. We then must provide a management systems approach that can cope with this type of uncertainty in product outcome. If you look carefully, most public policies are developed on the assumptions that underlay some academic discipline. In other words, the policy solution flows from the academic discipline. In engineering, the basic underlying assumption is marginality -- a continuous variable. In biology, the underlying assumption is threshold limits - a discontinuous variable. The distinction between engineering assumptions of marginality and biological assumptions of threshold have a substantial bearing on how we describe the production functions for traditional hatchery production and supplementation production. (see figure 3)

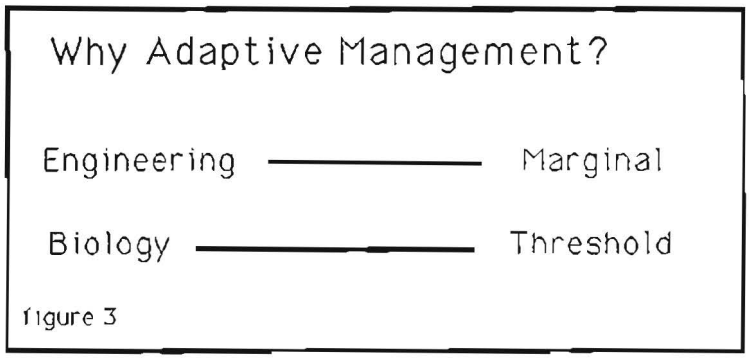


figure 3

IV. Engineering has been an underlying assumption of traditional hatchery production . With the introduction of basin wide supplementation the biological threshold realities will dramatically affect the production function and the organizational and administrative design for this new production function. This is illustrated in Chart 4 where the production function for hatcheries (H) has a substantially different shape from the new supplementation production function (S).

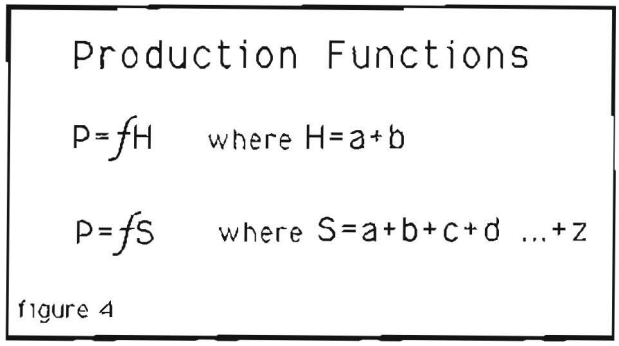


figure 4

V. Phasing in the organization is a particularly important concept for the YK project. If we look at the project construction schedules and likely monitoring and evaluation needs you are looking at an eight or nine year time table as the project moves from pre-design to design to construction to operation. The basin management regime will require a long range incremental staffing and training strategy if cost effective management is to be achieved.

Yakima-Klickitat Production Project
Administrative Design Group

Group Dynamics Exercises - Summary

On February 26 and March 2, meetings were held at Portland State University. The purpose was to define objectives and tasks that the project organization will accomplish.

Participants at the February 26 meeting included Tom Clune-BPA, David Fast-YIN, Bob Gatton-CH2M Hill, Bob Hager-WDF, Lynn Hatcher-YIN, John Kerwin-WDW, Rich Lincoln-WDF, John Miller-USFWS, Lars Mobrand-consultant, Phil Roger-consultant, Roy Sampsel-project leader, Harry Senn-consultant, Tom Scribner-YIN, and Harry Wagner-NPPC. The PSU administrative design team included Jack Churchill-Principal Investigator, Sheldon Edner-Department Head of Public Administration, Lee Shissler-Invesitigator, and Randall Smith-Scientist.

Participants at the March 2 meeting included Roger Fiander-YIN, Kahler Martinson-WDF, Jerry Neal-WDW, Roy Sampsel-project leader, and Elmer Schuster-YIN, as well as the PSU administrative design team.

Three group exercises were accomplished at the first meeting - hiring a hypothetical manager to fill the "top box," consideration of organizational design options, and definition of tasks.

Three group exercises were accomplished at the second meeting - hiring a hypothetical manager to fill the "top box," definition of tasks and associated organizational relationships, and phasing in the organization.

The purpose of conducting the group exercises was twofold. First, we elicited information from the participants and drew conclusions, as summarized below. Second, and just as significant, participants gained experience in addressing organizational design issues in an environment not of their own making.

Information about conclusions that the participants reached is summarized in the following pages. In addition, we initially conclude that project participants at both the policy and technical level would benefit greatly from exercises similar to those conducted at the two meetings. Such exercises should focus on defining terms, filling in general ideas with specifics, and reaching working consensus on conclusions. External facilitation should be provided by parties not directly involved in the project.

Hire the "Top Box" exercise. Participants in both meetings worked through a selection process for choosing a project manager or CEO from a list of hypothetical candidates. We were somewhat surprised and encouraged that the choices made and preferences expressed by both groups were very similar. From the comments of the participants, we were able to compile the following list of attributes deemed necessary to fill the top box:

-Administrative ability emerged as the single most important attribute. Included in administrative ability were skills such as controlling all aspects of a complex organization, providing accountability for public funds, supervising a variety of personnel, negotiation abilities, public relations skills, and political awareness.

-Budgeting skill meshes with administrative ability, but was judged to deserve a separate category. Tasks in this area would include developing a budget, submitting proposals to the funding agency, negotiating toward a final decision, and administering the approved budget according to the AOP.

-Technical skills and experience were considered desirable, but there was a variety of opinion on the importance of previous scientific or hatchery management skills. Participants in the second meeting agreed that a good administrator could gain needed technical appreciation on the job.

- Communication skill was considered important, for the external dimension as well as the internal dimension.

-A balance between the various skills and attributes mentioned above was considered essential. Participants in the first meeting had more diverse opinions about the balance between administrative and technical skills, while participants in the second meeting considered administrative skills far more important. Discretion was considered necessary to avoid the situation where the top box person would impose his or her personal direction on the organization.

-Finally, all participants agreed that the top box must be filled by somebody with a sense of mission and the energy to carry through or, as one participant put it, "fire in the belly."

Organizational objectives. From the group exercises at the February 26 and March 2 meetings, we compiled a list of objectives for the organization. This is not a complete list, and there is much refining and discussion yet to come, but there was a working consensus that certain objectives should emerge as primary considerations in structuring the organization. Objectives which were identified are grouped together where they appear similar. Where two objectives are exact duplicates, one has been deleted in the interest of brevity.

*** Policy and administration related objectives:
- Objective: Implement policy as defined by the policy group or "board of directors."
- Objective: Separate policy and technical activities.
- Objective: Allow all disciplines good representation, with equal access to the CEO to promote objective decision making.
- Objective: Give all management entities an equitable role in activities.

*** Coordination objectives:
- Objective: Coordinate different parts of the organization.
- Objective: Provide for a mix of production and monitoring & evaluation functions.
- Objective: Integrate implementation of production and monitoring & evaluation and administrative aspects of the program in an efficient manner to meet project goals and objectives.
- Objective: Institutionalize and integrate co-equal status of production and monitoring & evaluation.
- Objective: Team building to develop feedback between production, monitoring & evaluation and administration.
- Objective: Minimize administrative layers.
- Objective: Emphasize R&D and production.
- Objective: Provide for both monitoring & evaluation and production.

*** Organizational development objectives:
- Objective: Adaptive management. Implement improvements in monitoring & evaluation and production programs based on iterative process.
- Objective: Self sufficiency in administration of budgeting, hatchery operations and monitoring & evaluation.
- Objective: Budget control.
- Objective: Effective, efficient expansion of control.
- Objective: Support continued growth and expansion.
- Objective: Build and maintain good relations in a very diverse basin.

*** Supplementation objectives:
- Objective: Supplementation design and analysis.
- Objective: Measure post-release survival and determine best rearing and release strategy.
- Objective: Test supplementation premise by building a production team and monitoring & evaluation team that work effectively together.

Organizational tasks. From the group exercises at the February 26 and March 2 meetings, we compiled a list of task categories which serve the objectives listed above. Careful consideration of these tasks might also lead to the formulation of new organizational objectives. As with the list of objectives, the task list is probably not a complete list, but certain tasks did emerge from our exercises and discussions. Discussion of these tasks will lead to the formulation of others. Unlike the objectives list, no effort has been made to list tasks in groups. There is also some duplication and overlap in this list. Assigning tasks to objectives should be done after further discussion of objectives, tasks and the divisions and relationships between them.

- Accounting.
- Adaptive management.
- Brood stock collection.
- Budget development.
- Capitol construction and capitol purchases.
- Conduct team building exercises.
- Coordinate with other agencies and interested groups.
- Cultural considerations.
- Data storage.
- Design the annual operating plan.
- Disease control procedures.
- Dispute resolution.
- Employment and personnel matters.
- Experimental design.
- Fish passage planning.
- Fixed facilities maintenance.
- Human resources management.
- Implement the annual operating plan.
- Marking & tagging.
- Operate a coordinated information system.
- Participate in harvest management design.
- Phasing in organizational elements over time.
- Policy recommendations.
- Policy interpretation.
- Political considerations.
- Public relations and advocacy.
- Quality control.
- Review the annual operating plan.
- Rolling stock maintenance.
- Water quality and quantity.

Task definition.

At our March 2 meeting, we examined some of the tasks developed ate the February 26 meeting, with the goal of defining them. We determined if each task might be considered internal or external, or both. In other words, would a particular task be accomplished entirely within the YK project organization, or entirely by an outside agency or entity? Or, if a task might require crossing organizational boundaries, what would be the relationship between the project and other entities in accomplishing a task?

Following are suggestions for tasks, whether they would be accomplished internally or externally, and consideration of some intra-organizational and inter-organizational relationships necessary to carry out each task.

An assumption that guided the discussion was that the "project" consisted of the Yakima Indian Nation (YIN), Washington Department of Fisheries (WDF), and Washington Department of Wildlife (WDW). Any task accomplished by the cooperative effort of these three agencies would be designated as "internal," and interaction with other agencies would introduce "external" elements to a task.

Data storage. This task might be broken down into components of collection, storage, retrieval and analysis of biological data. This task would be accomplished internally and externally. Collection of data would be a project function. The Bureau of Reclamation (BR) would store the data on its mainframe computer, and this would comprise the main "data stream." A coordinated information system (CIS) could be used to feed data into storage, make data available to agencies involved in the project, and communicate analyses to interested parties. Access to project results might be provided by gaining access to the CIS, and/or through a network similar to FISHNET. WDW and WDF would benefit from access in their roles as management agencies, and in their independent roles as state resource management agencies.

Brood stock selection. Two elements in this task are selection of particular characteristics required in brood stock, and the physical activity of getting fish which conform to appropriate criteria. This task would be an internal project function. YIN, WDW and WDF would be responsible for coordinating both elements of this task.

Review and approval of the annual operating plan (AOP). This task would be internal and external. Primary responsibility for developing the AOP would lie with YIN, WDW and WDF. An external element would consist of review and approval of expenditure proposals by Bonneville Power Administration (BPA), as the funding agency. The AOP would be a "consensus document."

Coordinate with others. This task would be internal and external. The management entities have coordination function as project participants, and as independent resource agencies. Policy decisions would determine whether interaction would be through the project, or through one or more of the agencies as independent entities. In U.S. vs. Oregon proceedings, for example, coordination would occur by making project information available to the YIN, which would then act independently of the project.

Experimental design. This task would be internal. There was a suggestion to institutionalize EDWG as presently composed, to allow the project to carry out this task.

Training. Two elements of this task might be on the job training (OJT) and formal education. This task would be internal and external, with a suggestion to "get it where you can." OJT might be accomplished primarily within the project, with the possibility of

sending personnel to other projects or facilities for additional OJT. More formal training might be accomplished by contracting with state and federal agencies, or private firms, or by enrolling personnel in courses at institutions such as the Fisheries Academy.

Dispute resolution. This task would be internal, and would be specified in the AOP. It was suggested that most organizations specify a dispute resolution process in their AOP or its equivalent. If a dispute affects funding level or requires a major shift in expenditure, it has an external element because it involves the funding agency. In such cases, the management entities would act in their independent roles, rather than in their project roles.

Reporting of project results. This task would be an internal responsibility, although reporting would be done to external entities. Some external reporting obligations would be specified in the AOP and contracts associated with the project. There would be an internal decision - a determination of readiness to go external - to undertake general reporting of specific project results to outside entities and interested parties.

Quality control. This task would be internal. There was no discussion of task elements or other details.

Harvest management. This task would be external. Harvest management is external to the project, and is determined by negotiations and procedures that are not project functions.

Budget development. This task would be internal. Review and approval, as part of the AOP, would be external, provided by the funding agency.

Personnel management. This task would be "internal, period!" An assumption was that personnel management was narrowly defined as signing paychecks, scheduling and other routine personnel duties.

Public relations. This task would be internal and external. An internal element would be educating the public as to project activities and benefits. It was suggested that this be a function of the "top box." The project would be responsible for educating the public concerning project activities, but would avoid dealing with the involvement of other agencies in the project. Internal PR responsibilities would be for the project as the project. External agencies such as BPA and CRITFC would be independently responsible for conducting public relations concerning their involvement in the project.

Peer review. This task would be external, by definition.

Maintenance. This task would be "internal, period!" It was suggested that internal responsibility for maintenance also be stated as "of everything!"

Monitoring. This task would be internal and external. Internal aspects would involve monitoring of research results and general project results. External aspects would involve monitoring of delivery on contractual obligations, adherence to budget, and other aspects defined in the AOP. Internal monitoring would involve program review. External monitoring would involve contract review.

Evaluation. This task would be internal and external. Internal elements would involve evaluation of achievements, production, fisheries objectives. External elements would involve contractual obligations.

Staffing. This task would be internal, and would be included as part of the internal task of developing the AOP.

Consolidate control. This task would be internal. Elements would include institutionalizing segments of the project by specifying organizational structure, formulating an organizational development plan, erasing apprehension about moving forward, and settling on a definition of the term "lead agency."

Engineering design. This task would be internal. Elements would include involving a production expert from the beginning of engineering design, filling the top box as early as possible, and tightening the link between operational input and design.

Yakima-Klickitat Production/Supplementation Project
Administrative Design Phase
Task Definition Meeting
Monday, February 26, 1990 - 9:30 AM to 2:00 PM
Portland State University - School of Business, Room 270

TO: Tom Clune, Bonneville Power Administration
David Fast, Yakima Indian Nation
Bob Gatten, CH_2M Hill
Bob Hager, Washington Dept of Fisheries
Lynn Hatcher, Yakima Indian Nation
John Kerwin, Washington Dept of Wildlife
Steve Leider, Washington Dept of Wildlife
Rich Lincoln, Washington Dept of Fisheries
John Miller, US Fish & Wildlife
Lars Mobrand, Biometrics Consultant
Phil Roger, Consultant
Roy Sampsel, RHS Associates
Harry Senn, Hatchery Consultant
To Scribner, Yakima Indian Nation
Harry Wagner, NW Power Planning Council

FROM: Jack Churchill, Principal Investigator

SUBJECT: Purpose and agenda for task definition meeting.

PURPOSE: The primary purpose is to define the administrative tasks and the interrelationship between tasks that need to be addressed as the Production/Supplementation project moves forward. The second purpose is to begin to define the alternative organizational arrangements for managing these tasks.

ASSUMPTIONS: In reviewing the Adaptive Management process the Council has established, and in reading your responses to the Delphi questionnaire, it seems clear that Production/ Supplementation is indeed a new technology and that the YK Project is the first full scale application of this technology. New technologies usually require new organizational arrangements both in the development, production and utilization processes. We make this assumption for the Production/Supplementation technology for the YK Project.

Adaptive management requires flexibility in organizational design so that tasks can be phased in and out as project objectives and production processes change.

The project experimental design and the preliminary architectural designs for the new facilities dictate a sub-basin geographical management strategy that will encompass present public, private , non profit hatchery facilities, the additional production supplementation facilities and natural spawning.

These three underlying assumptions will affect both organizational design and dynamics.

PREPARING FOR THE MEETING: In preparing for the meeting we are asking you to do four things:

1. Reflect on the 2nd round Delphi questionnaire .

2. Examine the qualifications of the hypothetical facilities manager candidates. We ask that you be prepared to talk about which qualifications you would prefer for the YK Project and why. We would like to discuss particular reasons for preferring one candidate over another.

3 . Reflect on the models for facilities organization which we have developed for discussion purposes. Identify organizational tasks and relationships between tasks that appeal to you.

AGENDA: Our tentative agenda is as follows:

Coffee and rolls. (9: 00 AM)
Introduction. (9:30 AM)
Facilities manager qualities identification.
Organizational design options.
Definition of "tasks."
Adjourn. (2:00 PM)

Administrative design conclusions and issues will be forwarded to the policy meeting group to take place at Portland State on March 5.

Sheldon Edner of the PSU Public Administration Department will facilitate. Other administrative design project personnel assisting are Randy Smith and Lee Shissler.

HOUSEKEEPING: See map for parking directions. Check at Security for parking permit. A light working lunch will be served.

CC: Roger Fiander
Kahler Martinson
Jerry Neal
Elmer Schuster

Organizational Relationship Meeting

Portland State University
Room 270, School of Business Administration
Friday, March 2, 1990 9:30 AM to 1:00 PM

To: Roger Fiander, YIN
Kahler Martinson, WDF
Jerry Neal, WDW
Roy Sampsel, RHS
Elmer Schuster, YIN

From: Jack Churchill, Principal Investigator

Here are the agenda and parking instructions for our meeting on the 2nd. We thought the meeting with the management people was very productive, and we look forward to continuing the progress we made on Monday.

We have a fairly short agenda, but we expect to work intensely for the entire length of the meeting. We have set aside the time from 9:00 to 9:30 for having coffee and getting settled. Then, we would like to plunge right in.

Our overall goal is to define the major activities of the project. We would also like to reach some conclusions about which agencies and entities should carry out, either individually or in combination, these activities.

PSU people who will help conduct the day's activities are Jack Churchill, Randy Smith and Lee Shissler.

Agenda:

9:00 Arrive and have coffee.
9:30 Administrative design progress report.
9:45 Results of the Task Definition meeting on February 26.
10:00 Exercise: Hire the hypothetical manager.
11:00 Exercise: Define organizational relationships.
12:00 Follow-up and conclusions.
1:00 Adjourn.

Thank you. See you at the meeting.

YAKIMA-KLICKITAT PRODUCTION PROJECT

ADMINISTRATIVE DESIGN GROUP

APPENDIX D

ANNOTATED BIBLIOGRAPHY

Highlights of literature review.

The literature review was planned around several areas of inquiry, and drew upon both primary and secondary materials.

The first area of inquiry was a pragmatic look at relevant experience in the administration of fishery research and production programs, including Indian Nation, State, Federal, and Canadian experiences in the Pacific Northwest.

This was followed by reviewing the experience of other analogous administrative experiences in the application of new technology. We looked at both public and private sectors, including research, extension, and demonstration processes for agriculture, forests, national parks, National Academy of Sciences Review Board, and the aerospace and electronic industries.

In the fields of public and business administration, we reviewed writings in administrative analysis and organization development, including implementation theory, change process theory, communications, organizational learning, quality circles, team building, staffing and training, education, information systems, systems management, intergovernmental relations, and interorganizational arrangements.

In the area of science administration, we reviewed materials of the American Association for the Advancement of Science, American Institute of Biological Science, National Academy of Science, and American Fisheries Society. We focused on areas such as managing intellectuals, institutional memory, scientific interaction, testability of hypothesis, peer review, research stability and funding, and scientific curiosity and creativity.

Yakima/Klickitat Production Project
Administrative Design Group
Annotated Bibliography

Adelman, I R. (Chair), B. L. Griswold, J. L. Herring, B. W. Menzel, L. A. Nielsen, R. L. Noble, H. L. Schramm, Jr., and J. D. Winter. 1990. Criteria for Evaluating University Fisheries Programs. A Report of the University Program Standards Committee. Fisheries 15(2):13-16.

Evaluation of multiple factors in considering the state of fisheries programs vary with objectives. Curriculum should be balanced to show some broad base of biological content at the bachelor's degree level, with opportunities for specialization. Higher degree programs are discussed.

Agranoff, Robert J. 1986. Intergovernmental Management. State University of New York, Albany, NY. 199 pp.

Alaska Department of Fish and Game. 1989. Special Report. Background of the Genetic Policy of the Alaska Department of Fish and Game. Technology and Development Section. Bob Davis and Bob Burkett, Eds. Alaska Department of Fish and Game, Division of Fisheries Rehabilitation (FRED), Enhancement and Development. Number 13. March, 1989. 13 p.

Alaska Department of Fish and Game. 1985. Special Report. Alaska Department of Fish and Game Genetic Policy. Genetic Policy Review Team, Bob Davis, Chair. Alaska Department of Fish and Game, Division of Fisheries Rehabilitation (FRED), Enhancement and Development . 13 p.

Alaska Department of Fish and Game. 1983. Fish Cultural Manual. Alaska Department of Fish and Game, Division of Fisheries Rehabilitation (FRED), June, 1983.

Alderfer, Clayton P. and L. Dave Brown. 1975. Learning From Changing: Organizational Diagnosis and Development. Sage Publications, Beverly Hills, CA. 228 pp.

Allendorf, F. W. and S. R. Phelps. 1980. Loss of Genetic Variation in a Hatchery Stock of Cutthroat Trout. Trans. Am. Fish. Soc 109(?):537-543.

Important review paper on methods and techniques in hatchery operations. Even though this paper is on Cutthroat Trout, many of the ideas are seminal to the supplementation process.

Allendorf, F. W. and N. Ryman. 1987. Genetic Management of Hatchery Stocks. In: N. Ryman and F. Utter, Eds. Population Genetics & Fishery management. Univ. of Washington Press, Seattle, Washington, U.S.A. pp. 141-159.

Amsden, Robert T. 1986. Problem Solving Comparisons: QC Circles, KT, Etc. in Berger, Roger W. and David L. Shores (editors). Quality Circles: Selected Readings. Marcel Dekker Inc., New York. pp. 148-154.

Argyris, Chris. 1971. Management and Organizational Development: The Path From XA to YB. McGraw Hill, New York. 211 pp.

Aulstad, D, T. Gjerdrem and H. Skjerold. 1972. Genetic and Environmental Sources of variation in Length and Weight of Rainbow Trout (Salmo gairdneri). J. Fish Res. Brd. Canada. 29:237-241.

Baird, John E. Jr. 1982. Quality Circle Leader's Manual. Waveland Press. Prospect Heights, IL. 294 pp.

Balchen, J. G. (Ed). 1987. Automation and Data Processing in Aquaculture. Proceedings of the International Federation of Automatic Control, Trondheim, Norway, August 18-21, 1986. Pergamon Press, Oxford, England, U.K. pp.

Aquaculture is meant to include fisheries enhancement, such as that which takes place in hatching and rearing operations for supplementation.

"Aquaculture and its related industrial activity, has so far been mostly a 'low technology' industry in the sense that the technical methods and apparatus employed are not particularly sophisticated." Balchen spells out the basic requirements for an automated aquaculture environment. Sensors and computers monitor and automatically adjust values for flow, temperature, oxygen, etc. In addition, the system collects data on numbers and size of fish, and automatically stores the information for later analysis. Information processing includes decision help when specific variables reach certain values.

Banks, J. L. and L. G. Fowler. 1982a. The Effects of Population Weight Loads and Crowding on Fall Chinook Fingerlings Reared in Circular Tanks. U. S. Fish and Wildlife Service, Abernathy Salmon Cultural Development Center. Technology Transfer Series, No. 82-3.

Banks, J. L. and L. G. Fowler. 1982b. Transportation, Storage, and Handling Studies of Fall Chinook Salmon Gametes and Newly Fertilized Eggs. U. S. Fish and Wildlife Service, Abernathy Salmon Cultural Development Series. Technology Transfer Series No. 82-4. 18 p.

Banner, David K. and John W. Blasingame. 1988. Towards a Developmental Paradigm of Leadership. Leadership and Organizational Development Journal. 9(1):7-16.

Leadership is a "complex, ephemeral process." Leadership theories and models contain contradictions and overlap. The authors conclude that there is no single best way to be a leader. They present what they call the "probabilistic developmental model."

Beck. 1990. Klickitat Salmon and Steelhead Hatchery Preliminary Design Report. R. W. Beck and Associates, Seattle, Washington.

Preliminary design for Klickitat River projects. Hatchery design lacks integration with conservation measures and public involvement. Standard design does not adequately address concerns about supplementation versus production or shifts to other species of fish.

Beck, 1987. Yakima River Basin Outplanting Facility Master Plan. Prepared for the Northwest Power Planning Council. R. W. Beck and Associates, Seattle, Washington.

Early contract report shows weaknesses related to educational and cultural concerns. Standard methods related to state projects lacks the comprehensive program that is the foundation of adaptive management. Focus for administrative design is to broaden this base, but has the base been set?

Beckhard, Richard and Reuben T. Harris. 1987. Organizational Transitions: Managing Complex Change. Addision Wesley, Reading, MA. 117 pp.

Behm, Robert D. 1988. Management By Groping Along. Journal of Policy Analysis and Management, 7(4): 643-663.

Behm says that public managers do and should manage by groping along. The idea is to have a clear sense of mission for the organization, even though the precise method of accomplishing the mission is not known, and can never be entirely known. There are so many management principles that the manager can't know exactly which ones apply and which ones don't in every situation.

Some of the most valuable strategies in organizations are developed by accident, through a process of trial and error, rather than according to a specific administrative design. The YKPP implication is that flexibility and willingness to adapt are important. Also, scientific personnel should have a fool-proof mechanism to weigh in with their findings and have them count in the administrative process.

Behm says that strategic planning is losing favor in business, while gaining favor in government. He favors incremental change and objects to the fact that too many American institutions have become dissatisfied with incremental changes in favor of strategic leaps. There is a general view that only large changes represent success. Management by wandering around (MBWA) is the idea (of Peters & Waterman) that managers do not isolate themselves from the environment they manage. The YKPP implication is that the most weight in management decisions should not be given to those who are, by nature, isolated from the operational process. Again, the suggestion is that researchers who are tied to the YKPP in a way that would enable them to appreciate the eventual outcomes of policy decisions should have major influence.

Bennis, Warren G. 1989. Why Leaders Can't Lead: The Unconscious Conspiracy Continues. Jossey-Bass, San Francisco. 169 pp.

Bennis, Warren G. and Burt Nanus. 1985. Leaders: The Strategies for Taking Charge. Harper & Row, New York. 244 pp.

Berger, Roger W. an David L. Shores (editors). 1986. Quality Circles: Selected Readings. Marcel Dekker Inc, New York. 327 pp.

Biller, Robert Paul. 1969, Organizational Capacity for Change and Adaptation: An Exploration in a Public Research and Development Organization. University of Southern California. Dissertation. 324. p.

Bish, Robert L. 1982. Governing Puget Sound. University of Washington, Seattle, WA. 137 pp.

Bjornn, T. C. 1977. Wild Fish Production and Management. In Ernest Schwiebert, ed. Columbia River Salmon and Steelhead. Proceedings of a Symposium, held in Vancouver Washington, march, 1976. Special Publication No. 10. American Fisheries Society, Washington, D. C. pp. 65-71.

Bjornn, T. C. 1978. Survival Production, and Yield of Trout and Chinook Salmon in the Lemhi River, Idaho. Univ. of Idaho, College of Forestry, Wildlife, and Range Sciences. Bulletin # 27, Moscow, Idaho. pp.

Blumm, Michael C. 1981. Hydropower vs Salmon: The Struggle of the Pacific Northwest's Anadromous Fish Resources of a Peaceful Coexistence with the Federal Columbia River Power System. Environmental Law 11:211-.

Key early article setting the stage for adaptive management in this region. Brings several important topics to be reviewed.

Blumm, Michael C. (1978). Questions of Balance. Columbia River Basin Anadromous Salmon and Steelhead. Hydroelectric Energy. Working Paper. Northwest Resource Information Center, Inc, and U. S. Fish and Wildlife Service, 61 p.

Legal perspective on Columbia River anadromous fish. Good review. Summarizes many of the administrative conflicts and agency concerns.

Bond, Carl E. 1979. Biology of Fishes. W. B. Saunders, Co., Philadelphia, PA, U.S.A. 514 p. File Book Z.

Good reference text on taxonomy, behavior, teleost biology. OSU. Teleost Biology discussed as classification, but useful for stream evaluation and non-game fisheries. See Moyle.

Brannon, E. and G. Klontz. 1989. The Idaho Aquaculture Industry. The Northwest Environmental Journal 5(1):23-35.

The aquaculture industry in Idaho is a unique one, owned entirely by Idaho residents. Farm size is determined by water supply available at relevant temperatures. Specifics to pond production are given. The industry is characterized as a sophisticated farming business that is vertically integrated and developing strong links with University research and development programs to improve production efficiency and environmental quality.

Brewer, William A. and Kai N. Lee. 1977. Institutional Constraints and Opportunities. Study Module V. Northwest Energy Policy Project, Pacific Northwest Regional Commission. 316 p.

Brown, Gerald F. 1978. SIGN Multi-Organizational Development. in Golembiewski, Robert T. and William B. Eddy. Organization Development in Public Administration, Part 2. Marcel Dekker Inc., New York. pp. 19-35.

Brown, William G., D. M. Larson, R. S. Johnston and R. J. Wahle. 1976. Improved Economic Evaluation of Commercially and Sport-Caught Salmon and Steelhead of the Columbia River. Oregon State University, Agricultural Experiment Station, Special Report 463. 30 p.

Bryant, Mason D. 1988. Gravel Pit Ponds as Habitat Enhancement for Juvenile Coho Salmon. Gen. Tech. Rept. PNW-GTR-212. U.D.Dept. of Agriculture, Forest Service, Pacific Northwest Research Station. 10 p.

Gravel pits built during road construction in the 1970s near Yakutat, Alaska filled with water and had connections to nearby rivers. Juvenile salmonids entered and established themselves. Populations of up to 2,000 fish could be maintained. Aquatic vegetation, water, exchange rate, and access have affected the number of salmon in the ponds. Fish habitat, salmonids, stream habitat management discussed.

Bumgardner, Harvey L., W. Ellis, R. P. Linton, C. W. Jung and J. A. Rigney. 1971. A Guide to Institution Building for Team Leaders of Technical Assistance Projects. Office of International Programs. North Carolina State University, Raleigh, North Carolina, U.S.A., Chapter pp.

Emphasis on institution building and training. Some ideas on leadership, linkages and linkage building processes. Operational monitoring also discussed.

Busack, C. 1990. Yakima/Klickitat Production Project Genetic Risk Assessment. Washington, Department of Fisheries, Olympia, Washington.

Business Week. 1987. What the Boss is Really Like. Business Week 3022:37-42

Informal statistical profile of corporate chief executive officers.

Byrne, John A. 1987. The Limits of Power. Business Week. #3022:33-35.

Power is not invested with corporate CEOs the same way it used to be. The CEO who rules by personal will or force of personality is increasingly rare.

Canada, Government, Department of Fisheries and Oceans. 1989a. Project: Bella Bella Salmonid Enhancement Project (Heiltsuk). CDEP , Vancouver, B.C., Canada.

The Heiltsuk Indian Band Council is required to carry out the continued development and operation of a Coho and Chum incubation and sea pen rearing facility and related salmonid enhancement activities in the Bella Bella area under contract to the Community Economic Development Unit of the Salmonid Enhancement Program of the Department of Fisheries and Oceans. 10 p + App.

Canada, Government, Department of Fisheries and Oceans. 1989b. SEP Community Involvement Directory, 1989-90. PIP and CEDP Projects. Vancouver, B. C.

The Community Involvement Unit, incorporates Public Involvement (PIP) and Community Economic Development (CEDP). These are organized on geographic lines to correspond to other elements of the Department of Fisheries and Oceans, given program delivery by one locally-based Community Advisor (CA). See paper by A. D. Rank.,1982.

Canada, Government, Province of British Columbia. 1982. Fraser River Estuary Study Phase II. Several Reports Including the following:

1. A Linked Management System. L.D. S. Wolfe.
2. Organizational Options for Linked Management. LD.S. Wolfe
3. Legal Provisions for Linked Management. L. John Alexander.
4. Referrals Systems Presently Used in the Fraser River Estuary Study Core Area. Richard D. McDougall
5. The Information Systems Report. Gary Reith.

Case, Thomas, Lloyd Dosier, Gene Murkinson and Bernard Keys. 1988. How Managers Influence Superiors: A Study of Upward Influence Tactics. Leadership and Organization Development Journal. 9(4):25-31.

Managers who employ certain successful techniques to influence their superiors are more likely to be judged competent and effective.

Cayer, L. Joseph and Louis F. Weschler. 1988. Public Administration: Social Change and Adaptive Management. St. Martin's Press, New York. 159 pp.

Chaney, E (Ed.) 1978. A Question of Balance. Water/Energy - Salmon and Steelhead Production in the Upper Columbia River Basin. Summary Report. 29 p.

Chilcote, M, S. Leider, and J. J. Lock. 1986. Differentials in Reproductive Success of Hatchery and Wild Summer-Run Steelhead Under Natural Conditions. Trans. Am. Fish. Soc. 115:726-735.

CH2M Hill. 1990. Yakima River Basin Salmon and Steelhead Facilities. Preliminary Design Report. CH2M Hill for Bonneville Power Administration. Sections + Appendices.

Description of preliminary design based on sketchy and approximate information on staffing and training. Administrative design estimates much higher staffing level and possible need for more complex facilities.

CH2M HILL. 1988. Eastbank Hatchery. Design Memorandum. Rock Island Fish Hatchery Complex. Public Utility District No. 1 of Chelan County, WA. Sections + Appendices.

Good description of current hatchery practice in Washington. Concepts related to mitigation and mitigation hatchery objectives.

Chubb, John E. 1983. Interest Groups and the Bureaucracy: The Politics of Energy. Stanford Univ. Press, Palo Alto, California, U.S.A.

Chung, Kae H. and Margaret Ann Gray. 1986. Can We Adopt the Japanese Methods of Human Resources Management? in Berger, Roger W. and David L. Shores (editors). Quality Circles: Selected Readings. Marcel Dekker Inc., New York. pp. 46-54.

Clark, William C. and R. E. Munn, Eds. 1986. Sustainable Development of the Biosphere. Cambridge Univ. Press, Cambridge, U.K.

Emphasis on environmental concerns in development and harvest of renewable resources. Important to concept of adaptive management.

Cleaver, Fred. 1977. The Role of Hatcheries in the Management of Columbia River Salmon. In Ernest Schwiebert, Ed., Columbia River Salmon and Steelhead. Proceedings of a Symposium, held in Vancouver ,Washington, march, 1976. Special Publication No. 10. American Fisheries Society, Washington, D. C. 214 p.

Collamore, Thomas J. 1989. Making MBO Work in the Public Sector. The Bureaucrat. 18(3):37-40.

Collamore describes the method employed by the Department of Commerce to track progress in meeting policy objectives. The Commerce model follows usual MBO procedure in its development of goals, measurable policy objectives, etc. The interesting feature seems to be the tracking of progress. Each year, 200 objectives are established and tracked through 2000 individual projects that occurred during the eight year period of interest. The system also appears to have a feature that automatically established a meeting between middle and top managers when certain conditions occur. (p.39)

Cole, Robert E. 1986. Learning From the Japanese: Prospects and Pitfalls. in Berger, Roger W. and David L. Shores (editors). Quality Circles: Selected Readings. Marcel Dekker Inc., New York. pp. 28-41.

Collins, Frank and Gary J. Mann. 1988. Change-Related Behavior and Information Systems. OMEGA. 16(5):369-381.

Examines effects of human needs, group influence and management style. Recommends a humanistic, considerate management style.

Colt, John, S. Mitchell, G. Tchobanogloous, and Allen Knight. 1979. California State Water Resources Control Board. Publication No. 65. The Use and Potential of Aquatic

Species for Wastewater Treatment. Appendix B. The Environmental Requirements of Fish. SWRCB, Sacramento, California, U.S.A. 240 p.

Conner, Patrick E. and Linda K. Lake. 1988. Managing Organizational Change. Praeger, New York. 192 pp.

Cornell, Jon E. and Stanley M. Herman. 1989. Change or Get Changed. Leadership and Organization Development Journal. Winter 1989:76-81.

Three stages of organizational change in the face of problems: denial, blaming, ownership.

Crutchfield, James A. 1989. Economic Aspects of Salmon Aquaculture. The Northwest Environmental Journal 5(1):37-52.

Paper focuses on economic aspects of net culture of salmon in Puget sound, compared to Japan and Norway. Interesting comparison of economic issues and non-issues that affect success. Washington State situation.

Dalton, Gene W. and Paul R. Lawrence (editors). 1970. Organizational Change and Development. R.D. Irwin, Homewood, Illinois, U.S.A. 393 pp.

deSolla Price, D. J. 1964(1989). The Science of Science. A Reprint of the the 1964 paper by D. J. deSolla Price. Science and public Policy 16(3):152-158.

The virtues of expert knowledge. Whoever heard of a science critic? The mystique of science is that it has Generals. Science placed in the context of history (historiography, historiology, historionomy). (Compare to the history of the Columbia River Basin and fisheries)

Dewar, Donald L. 1986. "To Measure or Not to Measure." in Berger, Roger W. and David L. Shores (editors). *Quality Circles: Selected Readings*. Marcel Dekker, Inc, New York. pp. 174-179.

Dewar, Jeff. 1986. "A Trend in the Wrong Direction." in Berger, Roger W. and David L. Shores (editors). *Quality Circles: Selected Readings*. Marcel Dekker, Inc, New York. pp. 119-123.

Donaldson, L. R. 1970. Selective Breeding of Salmonid Fishes. In W., J.McNeil (Ed.). Marine Aquaculture. Oregon State University Press, Corvallis, Oregon, U.S.A. pp. 65-74.

Review of aquacultural patterns and objectives. Relates to Donaldson's present position with the Columbia Basin Fish & Wildlife Authority. CBWFA.

Drucker, Peter F,. 1989. The New Realities. In Government and Politics/ In Economics and Business/ In Society and World View. Harper & Row Publ., New York, NY, U.S.A. 276 p.

Changes in organizations include changes in perspectives. Shift away from social programs and governmental solutions to large problems. Major change is the shift to a knowledge society in all countries. The knowledge worker. Knowledge now shifts from an ornament to a necessity. Knowledge, then becomes the capital of a developed economy. For the YKPP, this suggests that the knowledge

contained in program, evaluation and monitoring has a critical role to play in the long-term success of the project. Stability becomes an important criterion for both institutional memory and the scientific resource knowledge base.

Dufour, Paul and Y. Gingras. 1988. Development of Canadian Science and Technology Policy. Science and Public Policy 15(1):13-18.

In 1987, the Federal, Provincial and Territorial governments of Canada signed the first National Science and Technology Policy. This marked a culmination of a period of cooperation in contrast to the previous and sometimes divisive and diversity of interests. Canada's program is heavily dependent on the ability to pool the Research and Development resources within the constituent elements.

Economist, The. 1988. How Companies Choose New Bosses. The Economist. 306 (7540):65-66.

Edwards, John D. and Brian H. Kleiner. 1988. Transforming Organizational Values and Culture Effectively. Leadership and Organization Development Journal. 9(1):13-16.

Englander, E., J. Fedmann and M. Hershman. Coastal Zone Problems: A Basis for Evaluation. Coastal Zone Management Journal 3(3): 1977.

Primary reference for the Linked Management System used by Province of British Columbia for the Fraser River Estuary Study. Considers elements of systems theory in that certain elements may be linked. See Porras also in a general description of the nature of linkages. Primary discussion in Wolfe and the Fraser River Estuary Study documents. Implications for YKPP include the broad management approaches taken by BC in managing estuarine resources. Many of the same tools can be applied to riverine systems as well. Review elements in Hynes for general stream and river concerns. In Englander, the complex nature of the Coastal Zone is evaluated.

Environment Canada. 1982. Review and Evaluation of Adaptive Environmental Assessment and Management. ESSA Environmental and Social Systems Analysts Ltd. Environment Canada, En 21-36/ 1983 E. 116 p.

Evaluation of AEAM systems analysis program. Analysis of Institutions and staff. System of Dr. C. S. Holling, International Institute of Applied Systems Analysis, Laxenburg, Austria, and Dr. Carl Walters, UBC, Institute of Resource Ecology, Vancouver, B.C., Canada. Assisted by U. S. Fish and Wildlife Service, Fort Collins, Colorado, U.S.A. Emphasis on staff, integration and synthesis of an approved plan. Different levels of plan development and implementation tempered by analysis and correction.

Erffmeyer, Robert C., Elizabeth S. Erffmeyer and Irving M. Lane. 1986. The Delphi Technique: An Empirical Evaluation of the Optimal Number of Rounds. Group and Organization Studies. 11(1/2; March/June):120-128.

The widespread use of the Delphi technique of decision making has led to many variations in format implementation by practitioners and researchers. The classic Delphi typically includes four rounds of questionnaires and feedback. This study establishes empirically the point of stability. Delphi groups reach stability in their decision making after several iterations, thus supporting the classic Delphi model.

Evans, Daniel J. and R. Hemmingway. 1984. Northwest Power Planning: Origins and Strategies. Northwest Environmental Journal 1(1):1-22.

Administrative level review of the Northwest Power Planning Council and the potential conflicts and solutions. Presents a hopeful picture of power planning in terms of interstate cooperation that has not been available previously

Ferris, Gerald R., T. Gregory Bergin and David C, Gilmore. 1986. Personality and Ability Predictors of Training Performance for Flight Attendants. Group and Organization Studies. 11(4; December):419-435.

Mental ability indicates success in training, while personality indicates success on the job.

Ferris, Gerald R., Donald B. Fedor, J. Gregory Chachere and Louis R. Pondy. 1989. Myths and Politics in Organizational Contexts. Group and Organization Studies. 14(1):83-103.

Character of an organization is partly defined by myths and politics that accompany organizations.

Flagg, T. A., L.. W. Harrell, J. L. Mighell and E. Slatick. 1989. Cle Elum Lake Sockeye Salmon Restoration Feasibility Study, 1988-1989. Annual Report. National Marine Fisheries Service, Seattle, Washington.

Flemming, I. A. and M. R. Gross. 1990. Latitudinal Clines: A Trade-Off Between Egg Number and Size in Pacific Salmon. Ecology 7(1):1-11.

The latitudinal variation in clutch size found in many animal species, including Pacific salmon, has been a an enigmatic problem in ecology. Flemming and Gross analyze egg number and egg size of 17 populations of coho salmon (O. kisutch) distributed over a latitudinal gradient. These populations have significant latitudinal increase in egg number, but a decrease in egg size. Hatchery processes are discussed.

Flemming, I. A. and M. R. Gross. 1989. Evolution of Adult Female Life History and Morphology in a Pacific Salmon (Coho: *Oncorhynchus kisutch*). Evolution 43(2):141-157.

Flynn, Randolph, Tom McCombs and David Elloy. 1990. Staffing the Self-Managing Team. Leadership and Organization Development Journal. 11(1): 26-31.

Forisha-Kovach, B. 1984. The Flexible Organization. Prentice-Hall, Englewood Cliffs, Jew Jersey, USA. 159 p.

Fowler, L. G. 1989. Feeds and Feeding Practices for Improved Fish Health. 1989. U. S. Fish and Wildlife Service Technology Transfer Series No. 88-1 AFF/ATC-89-04. 33 p.

Good hatchery practice. Internal report type of literature available to the communicating group, but generally unavailable to science in the broad sense.

Fowler, L. G., J. L. Banks, J. K. McIntyre, and C. B. Schreck. 1988. Selective Breeding of Abernathy Fall Chinook Salmon: Experimental Design and Hatchery Performance of 1973-1977 Broods. U.S. DOI, FWS, Technology Transfer Series No. 86-1 FR1/ATC-88-05 31 p.

Experimental internal report. Good experimental report on hatchery practice. Brood evaluation.

Frandsen, B. S. and R. V. V. Vidal. 1988. An Analysis of the Distribution System of a Brewery. OMEGA 16(6):509-512.

Examines and compares advantages of a decentralized vs. centralized enterprise.

Fulton, L. A. 1970. Spawning Areas and Abundance of Steelhead Trout, and Coho, Sockeye, and Chum Salmon in the Columbia River Basin Past and Present. National Marine Fisheries Service, Spec. Sci Ret No. 618., 37 p.

Gharrett, A. J., S. M. Shirley, and G. R. Tromble. 1987. Genetic Relationships Among Populations of Alaskan Chinook Salmon (*Oncorhynchus tshawytscha*). Can. J. Fish. Aquatic Sci. 44(?):765-774.

Gharrett, A. J. and S. M. Shirley. 1985. A Genetic Examination of Spawning Methodology in a Salmon Hatchery. Aquaculture 47:245-256.

Gibb, Jack R. 1978. Trust: A New View of Personnel and Organizational Development. Guild of Tutors Press, Los Angeles, California, U.S.A. 320 p.

Gillispie, Charles C. . 1968. Remarks on Social Selection as a Factor in the Progressivism of Science. Am. Aci. 56(4):439-450.

Glaser, Edward M. and Donald F. Van Eynde. 1989. Human Resource Development, Team Building, and a Little Bit of 'Kiem Tau.': Part I. Leadership and Organization Development Journal. 7(1)::20-24.

Glaser, Edward M. and Donald F. Van Eynde. 1989. Human Resource Development, Team Building, and a Little Bit of 'Kiem Tau.': Part II. Leadership and Organization Development Journal. 7(2):21-24.

The North Vietnamese army succeeded against superior American forces because of certain team building and cooperative exercises that were a formal part of their operations. There was a high degree of investment in the decisions, due to a balance between sharing power and keeping control.

Goldsmith, Maurice and A. Mackay, 1964(1989). In Commemoration of Bernal. Science and Public Policy 16(1):139-142. (Reprinted earlier article)

Science as a means of shaping the future. General article on the social functions of science. Training, research and education; application. Provides a background of science and public policy missing in adaptive management.

Goldstein, Jeffrey. 1989. The Affirmative Core of Resistance to Change. Organizational Development Journal. 7(1):32-38.

Organizational change is difficult to achieve because members tend to affirm the status quo and deny the change. Recommends circular questioning, purpose contrasting, and positive relabelling.

Golembiewski, Robert T. and Alan Kiepper. 1976. MARTA: Toward an Effective, Open Giant. Public Administration Review. 36(1): 46-60.

Grant, Gordon. 1988. The RAPID Technique: A New Method for Evaluating Downstream Effects of Forest Practices on Riparian Zones. U. S. D. A. , Forest Service. Gen. Tech, Rep. PNW GTR-220. Pacific Northwest Research Station. 36 p.

The RAPID technique (Riparian Aerial Photographic Inventory of Disturbance) is a method for using measurements made on aerial photographs of patterns of riparian canopy disturbance to evaluate changes in channel conditions through time and to link such changes with their possible upstream causes.

Grief, Irene (editor). 1988. Computer Supported Cooperative Work Morgan-Kaufmann Publishers, San Mateo, CA. 783 pp.

Groot, C., and T. P. Quinn. 1987. Homing Migration of Sockeye Salmon, *(Oncorhynchus nerka)* , to the Fraser River. Fishery Bull. 85(3): 455-469.

Gryna, Frank M. 1981. Quality Circles: A Team Approach to Problem Solving. Amacom, New York. 96 pp.

Gupta, Jatinder N. D. and Thomas M. Harris. 1989. Decision Support Systems for Small Business. Journal of Systems management 40(1):37-41.

Hager, Robert G. and R. E. Noble. 1976. Relation of Size at Release of Hatchery-Reared Coho Salmon to Age, Size, and Sex Composition of Returning Adults. Prog. Fish. Cult. 38(3):146-147.

Hall, James D. and Calvin O. Baker. 1982. Influence of Forest and Rangeland Management on Anadromous Fish Habitat in Western North America. Rehabilitating and Enhancing Stream Habitat: 1. Review and Evaluation. USDA, Forest Service, Gen.Tech.Report PNW-138.29 p.

Forest Service binder of various forest impact topics. General review of stream rehabilitation.

Hardin, Garrett. 1968. The Tragedy of the Commons. Science. 162(3859): 1243-1248.

Harrell, L. 1990. Development of Salmonid Health Strategies Within the Yakima/Klickitat Production Project. National Marine Fisheries Service. Manchester, Washington.

The Columbia River Basin and the developed hatchery system has had a number of setbacks due to disease and parasitism. The report reviews general strategies for fish disease and general health.

Harris, Philip R. and Dorothy L. Harris. 1989. High Performance Team Management. Organization and Development Journal. 10(4):28-32.

Harrison, Michael I. 1987. Diagnosing Organizations: Methods, Models and Processes. Applied Social Research Methods Series Vol. 8. Sage Publ. Newbury Park, California, U.S.A. 159 p.

Describes open systems research methodology and comments on utility of diagnostic methods. The roles of the consultation and clients are discussed. Power relations and system fit within organizations is explored as an areas that often needs examining.

Harrison, Penny H. 1986. The Evolution of a New Comprehensive Plan for Managing Columbia River Anadromous Fish. Environm. Law 16:705-729.

Development of the component parts of comprehensive planning in the Columbia River Basin. Elements of the Northwest Power Planning Council.

Healey, M. C. and W. R. Heard. 1984. Inter- and Intra-population Variation in the Fecundity of Chinook Salmon (*Oncorhynchus tshawytscha*) and its Relevance of Life History Theory. Can. J. Fish. Aquatic Sci. 41:467-483.

Hedges, John I, H. J. Turin and John R. Ertel. 1984. Sources and Distributions of Sedimentary Organic Matter in the Columbia River Drainage Basin, Washington and Oregon. Limnol. Oceanogr. 29(1):35-45.

Non-woody angiosperm tissues and gymnosperm woods are the major types of vascular plant debris in bottom sediments from 16 sites within the Columbia River and its tributaries. In tributary sediments relative abundances of these types of tissue vary regionally and are consistent with drainage basin vegetation. Within the extensively dammed main river, vascular plant debris mixtures are

more uniform, indicating downstream mixing of sedimentary material from reservoir to reservoir. Vascular plant tissues account for an average of a third of the total sedimentary organic matter at the 16 river sites.

Heggberget, T. G. 1988. Timing of Spawning in Norwegian Atlantic Salmon (*Salmo salar*). Can. J. of Fisheries and Aquatic Sci 45:845-849

Heming, T. A. 1982. Effects of Temperature on Utilization of Yolk and Chinook Salmon (*Onchorynchus tshawytscha*) Eggs and Alevins. Can. J. Fish. Aquatic Sci. 45(1):184-190.

Hershberger, William K. 1988. Directed and "Inadvertent" Genetic Selection in Salmonid Culture. Results and Implications for the Resource, and Regulatory Approaches. In: W. J. McNeil (Ed.): Salmon Production, Management, and Allocation. Biological, Economic, and Policy Issues. Oregon State University Press, Corvallis, Oregon, U.S.A. pp 177-185.

Useful summary of the historical aspects of genetic selection in salmon culture and hatchery processes. Discusses the regulatory approaches and their relation to hatchery processes, salmonid management and administration.

Hershberger, W. K. and R. N. Iwamoto. 1983. Genetics Manual and Guidelines for the Pacific Salmon Hatcheries of Washington, Univ. of Washington, Seattle Washington, Unprocessed Report, 83 p.

Hilborn, Ray. 1990. Is Learning Possible. Perspective. Can. J. Fish. Aquatic Sci. In Press.

Describes essential steps in learning and addresses impediments to learning: difficulty in replication and control, variable natural systems, inadequacies in institutional memory.

Hilborn Ray. 1987. Living with Uncertainty in Resource Management. N. Am. J. Fish Mgmnt. 7(1):1-5.

Adaptive management focuses on the high level of uncertainty in biological systems. Indeed, if one parameter should be highlighted it is uncertainty and diversity within biological populations and communities.

Hilborn, Ray and Wilf Luedke. 1988. Rationalizing the Irrational: A Case Study of Use Group Participation in Chum Salmon Management. Can. J. Fish. Aquatic Sci. 44:1796-1805.

Holder, Robert J. 1989. Leaders and Visions: Transcending to Higher States of Being. Organizational Development Journal. 6(1):50-57.

Suggests differences between types of leaders, with a succession of higher states proceeding from conventional, to innovative, to visionary, to transformational.

Holling, C. S. Ed. 1978. Adaptive Environmental Assessment and Management. John Wileiu & Sons, New York, NY, U.S.A.

Hooper, Peter R. 1982. The Columbia River Basalts. Science 215(4539; 19 March):1463-1468. File Geology

Geological perspective of the Columbia Basin. Specific and Technical Information on Basalts in the basin. Compare to USGS NAWQA program and evaluation of basalts in the Yakima Basin. Compare heavy metals.

Hutchins, David. 1985. Quality Circle Handbook. Pitman Publishing, London, England. 272 pp.

Hynes, H. B. N. 1970. Biology of Running Waters. Univ of Toronto Press, Canada.

Perspective on stream and river systems. Multiple parameters that interact to develop a dynamic system. Importance of interactions and cyclic changes in stream and riverine systems. Much is based on Hynes early work on a Welsh mountain stream. A critical reference in the historical understanding of aquatic sciences and relationships in stream and riparian systems.

Hynes, H. B. N. 1974. The Biology of Polluted Waters. Univ of Toronto Press, Canada; Univ. Printing House, Cambridge, U.K.202 p.

Emphasis on stream and river systems. Follows his previous research on aquatic systems and interactions between elements. Excellent reference.

Hynes, J. D., E. H. Brown, Jr., J. H. Helle, N. Ryman and D. A. Webster. 1981. Guidelines for the Culture of Fish Stocks for Resource Management. Can. J. Fish. Aquatic Sci. 38:1867-1876.

Ihssen, P. E., H. E. Booke, J. M. Casselman, J. M. McGlade, N. R. Payne, and F. M. Utter. 1981. Stock Identification: Materials and Methods. Can. J. Fish. Aquatic Sci 38:1831-1855.

Ihssen, P. E., D. O. Evans, W. J. Christie, J. A. Reckahn, and R. L. DesJardine. 1981. Life History, Morphology and Electrophoretic Characteristics of Five Allopatric Stocks of Lake Whitefish (*Coregonis clupeaformis*) in the Great Lakes Region. Can. J. Fish. Aquatic Sci 38:1790-1807.

Electrophoresis as a tool for selecting allopatiric stocks of whitefish. Technique is not generally applied.

Kakabadse Andrew and Charles Magerison. 1988. Top Executives: Addressing Their Management Development Needs. Leadership and Organization Development Journal. 9(4):17-21.

Kamenetzky, Mario and R. H. Maybury. 1989. Economic Concepts. Technical and Financial Rationality with Concern for Human Needs and Ecosystems: A Conceptual Framework. Science and Public Policy 16(2):68-72.

An economic model is proposed that will take into account the effect of commercial activity on the environment. A series of options are given for sustaining human life without sacrificing environmental services. These are discussed in relation to the various aspects of fishing. A key task for education is to acquaint decision-makers with the idea that there is more to consider than economic efficiency.

Kamenetzky, Mario and R. H. Maybury. 1989. Sustainable Agriculture. Agriculture in Harmony with Nature. Science and Public Policy 15(2):73-82.

Among many decision-makers in agriculture, many are beginning to recognize that modern agriculture is on an unsustainable course. An alternative is regenerative agriculture, which is based on the principle of understanding and working with nature. Basis of improving social administration includes the 1. sense of purpose and direction; 2 evaluate opportunities and risks; develop a network of influence or support. Locate others in mutual transactions related to common goals. (World Bank policy). Effort on mobilizing local resources: Look at basic needs in relation to the community. Look at levels of technology in relation to the community.

Kendra, W. 1989. Evaluation of Wastewaters Generated by Freshwater Fish Culture Activities in Washington State During the 1989 Summer Low-Flow Period. Washington State Department of Ecology. Rep. No. 89-17. 58 p.

Kincaid, H. L. 1976a. Inbreeding in Rainbow Trout (Salmo gairderni). J. Fish Research Brd. Canada 33:2420-2426.

Kincaid, H. L. 1976b. Inbreeding Depression in Rainbow Trout. Trans. Am. Fish. Soc. 105(2):273-280.

Valuable reference to the developing concept of inbreeding patterns.
Form the basis for much work done by modern workers in fish genetics

Kleiner, Biran H. and Walter A. Corrigan. 1989. Understanding Organizational Change. Organization and Development Journal. 10(3):25-31.

Kleiner, Brian H. and Caryn Yada. 1986. Understanding the Dealing with Procrastination. J. Systems Management 37(1):7-11.

Knapp, R. H. and H. B. Goodrich. 1952. Origins of American Scientists. Univ. of Chicago Press, Chicago, Illinois, U.S.A.

Kuhn, Thomas. S. 1962. The Structure of Scientific Revolutions. University. of Chicago Press, Chicago, IL 210 pp.

Larkin, Peter A. 1974. Play It Again Sam - An Essay on Salmon Enhancement. J. Fish. Res. Brd Can 31:1433-1456.

Leary, R. F., F. W. Allendorf and K. L. Knudsen. 1985. Developmental Instability as an Indicator of Reduced Genetic Variation in Hatchery Trout. Trans. Amer. Fish. Soc 114:230-235.

Leatherland, J. F., L. Lin, N. E. Down and E. M. Donaldson. 1989. Thyroid Hormone Content of Eggs and Early Developmental Stages of Five *Oncorhynchus* Species. Can. J. Fish. Aquatic Sci. 46(12): 2140-2145.

Leatherland, J. F., L. Lin, N. E. Down and E. M. Donaldson. 1989. Thyroid Hormone Content of Eggs and Early Developmental Stages of Three Stocks of Goitered Coho Salmon (*Oncorhynchus kisutch)* from the Great Lakes of North America, and a Comparison with a Stock from British Columbia. Can. J. Fish. Aquatic Sci 46(12):2146-2152.

Lee, Kai N. 1990. Deliberately Seeking Sustainability. In Press. Policy Sciences. 21 p.

Lee, Kai N. 1989. The Mighty Columbia: Experimenting with Sustainability. Environment. (July/Aug):6-11.

Lee, Kai N. and D. L. Klemka. 1980. Electric Power and the Future of the Pacific Northwest. Univ. of Washington Press, Seattle, Washington, U.S.A.

Lee, Kai N. and J. Lawrence. 1986. Adaptive Management: Learning from the Columbia River Basin Fish and Wildlife Program Environmental Law 16:431-60.

Leider, S. A., M. W. Chilcote and J. J. Lock. 1984. Spawning Characteristics of Sympatric Populations of Steelhead Trout (Salmo gairdneri): Evidence for Partial Reproductive Isolation. Can. J. Fish. Aquatic Sci. 41:1454-1462.

Useful reference is the development of population characteristics of steelhead. Important in the YKPP both on the Yakima and Klickitat in terms of potential for reproductive isolation and depleted populations. Also some consideration for future restoration work on populations.

Likert, Rensis. 1986. The Principle of Supportive Relationships as an Organizing Concept. in Berger, Roger W. and David L. Shores (editors). *Quality Circles: Selected Readings*. Marcel Dekker, Inc, New York. pp. 273-285.

Lindblom, Charles E. 1959. The Science of Muddling Through. Public Admin. Rev. 19(1):79-88.

Useful article on gaining perspectives on the work and the actual accomplishments of a program. Useful concerns for any large project.

Lloyd, D. G. 1987. Selection of Offspring Size at Independence and Other Size-versus-Number Strategies. Am. Nat. 129(?):800-817.

Loehle, C. 1990. Roundtable: A Guide to Increased Creativity in Research - Inspiration or Perspiration. Bioscience40(2; February):123-129.

There are four requirements of a successful career in science: Knowledge, Technical Skill; Communication, and Originality or Creativity. The element of creativity and originality is often overlooked in evaluating scientific endeavor. Several strategies are presented that may promote scientific creativity. The author compares the modern demands to those placed, perhaps, on Darwin and Einstein. In that context, we can evaluate the scientific climate necessary for innovation, creativity and progress. One comparison is the relation of difficulty of a problem and its likely payoff value (The Medawar Zone). Solving an easy problem with a low payoff, because it is well within reach, is not a real advance. Solving a more difficult problem may have a high payoff, but may not pay at all. Administrators have a difficult time with this necessary concept for good science. As the author says:

"The path of creativity is strewn with the bones of those consumed by the vultures of mediocrity, accountability and responsibility. One cannot schedule creative breakthroughs, budget for them, or prove them in advance to a review panel. An entirely different, flexible approach to science is necessary to encourage creativity."

Lorsch, Jay William and Paul R. Lawrence (Eds). 1970. Studies in Organization Design. R. D. Irwin, Homewood, Illinois, U. S. A. 196 p.

Lyden, F.J. 1988. Value Orientations in Public Decision Making. Journ. Policy Studies. Summer 1988: 843-856.

Reports on application of Kluckhon values orientation instrument to reveal misunderstandings arising between government agency and its client groups regarding use of natural resources. Concludes that Kluckhon analytical tool is superior to Dominant Social Paradigm (DSP) and New Environmental Paradigm (NEP) for studying certain institutional arrangements.

McConnell, Les. 1987. Economic Contributions Made by Indian Tribes in Washington State. U. S. DOI, Bureau of Indian Affairs, Branch of Fisheries, Portland Area Office, Portland, Oregon. 10 p. +

Summary of economic contributions in fisheries and forestry. State of Washington. From the Boldt decision instructions to the tribes include: 1. Management of fish and fishing seasons. 2. Implementation and enforcement of fishing regulations consistent with the States' conservation standards and 3. Enroll tribal fishermen and identify with a federal identification card. BIA requested special funds from the congress to implement the terms and conditions of the court decision. This article points to some necessary relations in education at the tribal level. This should be reviewed in the context of the U.S. Fish and Wildlife Service Training Agreement.

MacDonald, P. D. M., H. D. Smith and L. Jantz. 1987. The Utility of Babine Smolt Enumerations in Management of Babine and other Skeena River Sockeye Salmon (*Oncorhynchus nerka*) Stocks. In H. D. Smith, L. Margolis and C. C. Wood (Eds.). Sockeye Salmon (*Oncorhynchus nerka*) Population Biology and Future Management. Can Spec. Publ Fish. Aquatic Sci 96, pp 280-295.

McGregor, Douglas. 1960. The Human Side of Enterprise. Harper & Bros., New York.

McKernan, Donald L. 1972. Science and Politics in National Fishery Management. In: Remedios W. Moore (Ed). 1972. Progress in Fishery and Food Science. University of Washington, College of Fisheries, Fiftieth Anniversary Celebration Symposium. Univ. of Washington. Publications in Fisheries, New Series, Volume 5. pp. 111-114.

McNeil, William J.(Ed.). 1988. Salmon Production, Management, and Allocation. Biological, Economic, and Policy Issues. Oregon State University Press, Corvallis, Oregon, U.S.A. 194 p.

Proceedings of the World Salmonid Conference. Dr. William J. McNeil, Convener. Notes on catch, landings, policy, genetics. Volume summarizes the general view of ocean and coastal fisheries in terms of management strategies and policy issues.

McPhail, John D. and C. C. Lindsey. 1970. Freshwater Fishes of Northwestern Canada and Alaska. Fisheries Research Board of Canada. Bulletin 173. Ottawa, Ont, Canada. 381 p.

Seminal text on Northwestern fish biology, U. S. and Canada. Useful and excellent reference of long-standing reputation. Important to stream habitat studies, non-game fisheries and population interactions. Continues in the present; see the following report for McPhail and Lindsay, 1986.

McPhail, John D and C. C. Lindsey. 1986. Zoogeography of the Freshwater Fishes of Cascadia (The Columbia System and Rivers North to the Stikine). In: C. H. Hocutt and E. O. Wiley (Eds), The Zoogeography of North American Freshwater Fishes. J. Wiley and Sons, New York, N.Y., U.S.A. pp. 615-637.

Important summary review of Columbia river fisheries and genetics. Zoogeography in fisheries context.

Mack, R. W., D. J. Cocheba, D. W. Green, and D. W. Hedrick. 1989. An Economic Impact Analysis of the Proposed Yakima/Klickitat Fishery Enhancement Project. Prepared for the Bonneville Power Administration, Portland, Oregon.

Margulies, Newton and Anthony P. Raia. 1972. Organizational Development: Values, Process and Technology. McGraw Hill, New York. 640 pp.

Margulies, Newton and Anthony P. Raia (editors). 1978. Conceptual Foundations of Organizational Development. McGraw Hill, New York. 401 pp.

Marrow, Alfred J., David G. Bowers and Stanley E. Seashore. 1967. Management by Participation: Creating a Climate For Personal and Organizational Development. Harper and Row, New York. 264 pp.

Marx, Leo. 1970. American Institutions and Ecological Ideals. Science 170(3961; 27 November):945-952.

Scientific and Literary Views of our Exansionary Life-Style are Converging, in the view of the author. What are the prospects, given the character of America's dominant institutions, for the fulfillment of the ecological idea? Plase this in the contest of the Columbia River Basin institutions and ideals. It is very easy for institutions to discount reality even in the face of valid documentation. Argues for the development of professional organizations in concert with existing institutions.

Meehan, William R. (Ed). 1976-1982. Influence of Forest and Rangeland Management on Anadromous Fish Habitat in Western North America. USDA, Forest Service, Gen. Tech. Report PNW-96. 15 parts, separate.

First of several parts. General reference on forest impacts on anadromous fish habitat. General stream impacts are reviewed in relation to forest practices. Application to stream habitat evaluation for salmonids.

Merton, Robert K. 1957. Priorities in Scientific Discovery. Am. Soc. Rev. 22(1957):635-659.

Merton, Robert K. 1961. Singletons and Multiples in Scientific Discovery. Proc. Am. Phil. Soc. 105(1961):470-486.

Miles, Raymond, E. 1975. Theories of Management: Implications for Organizational Behavior and Development. McGraw Hill, New York. 240 p.

Miller, R. J. and E. L. Brannon. 1982. The Origin and Development of Life History Patterns in Pacific Salmonids. In: E. L. Brannon and E. O. Salo, (Eds). Proc. Salmon and Trout Migratory Symposium, Univ. of Washington, School of Fisheries, Seattle, Washington, U.S.A. pp. 296-309.

Milner, G. B., D. J. Teel, F. M. Utter, and C. L. Burley. 1981. Columbia River Stock Identification Study: Validation of Genetic Method. Report to BPA. Contract, 51 p.

Milner, G. B, D. J. Teel, and F. M. Utter. 1983. Genetic Stock Identification Study. Report to BPA. Contract, 95 p.

Mohr, William L. and Harriet Mohr. 1983. Quality Circles: Changing Images of People at Work. Addison-Wesley Publishing, Reading, MA. 258 pp.

Moore, Remedios W. 1972. Progress in Fishery and Food Science. University of Washington, College of Fisheries, Fiftieth Anniversary Celebration Symposium. Univ. of Washington. Publications in Fisheries, New Series, Volume 5. 223 p.

Mouzelis, Nicos P. 1967. Organization and Bureaucracy. Aldine de Gruyter, New York. 230 pp.

Moyle, Peter B. 1976. Inland Fishes of California. Univ of California Press, Berkeley, California, U.S.A., 405 p.

Useful general reference on teleost fish. Ecology and behavior is especially good. Important to stream habitat evaluation and population interactions.

Moyle, Peter B and Bruce Vondracek. 1985. Persistence and Structure of the Fish Assemblage in a Small California Stream. Ecology 66(1):1-13.

The persistence and structure of a small buy morphologically diverse fish assemblage of a California stream was examined to see if it had the characteristics of a deterministically regulated or stochastically regulated community. We evaluated persistence by monitoring the fish populations for 5 yrs and examined resource use by measuring summer microhabitats and diets of each species. .. The most abundant species were segregated by habitat, microhabitat and/or diet. The observed fish assemblage thus appears to have the characteristics of highly structured community, as expected under Connell's "niche diversification hypothesis". The structure observed is probably characteristic of fish assemblages in cold-water streams throughout North America that contain the same or similar species. (Trout/dace/suckers) (Microhabitats/Niche Diversity/Resource partitioning)

Mullan, J. W. 1986. Determinants of Sockeye Salmon Abundance in the Columbia River. 1880-1982: A Review and Synthesis. U. S. Fish and Wildlife Service, Report FRI/FAO-84-4. Leavenworth, Washington

Valuable review from the hatchery perspective. Sockeye fisheries in the historical context of the Columbia River Basin.

Mullanb, J. W. 1983. Overview of Artificial and Natural Propagation of Coho Salmon (*O. kisutch*)) on the Mid-Columbia River. U. S. Fish and Wildlife Service. Report FRI/FAO. Leavenworth, Washington.

Murray, C. B. and J. D. McPhail. 1988. Effect of Incubation Temperature on the Development of Five Species of Pacific Salmon (Oncorhynchus) Embryos and Alevins. Can. J. Zoology 66(2):266-273.

See McPhail & Linsey,(1986) also. Good paper on variation in temperature parameters.

Murrell, Kenneth L. 1988. The Case of the Line and the Mob, or What a Good O.D. Consultant Should Know About Basic Organizing Principles. Organization Development J. 6(3):40-45.

Nanda, Ravinder, 1986. Training in Team and consensus Building. Management Solutions 31(9):331-36.

National Academy of Science. 1985. Reducing Bureaucratic Accretion in Government and Industry. Government-University-Industry Research Roundtable. NAS, Washington, D. C. U.S.A.

High levels of reporting, quarterly reports, and size and frequency of research proposals impact quality of research. Top researchers diverted to administrative tasks by this high level of bureaucratic burden. Decline in both efficiency and productivity for research purposes can be documented. See Sanders for full discussion.

This report indicates that YKPP look at interaction of investigation staff with administrative emphasis on efficiency and best use of research personnel. Decline of research emphasis to administration that diverse top researchers to tasks of grant writing and quarterly report administration. What is the long-term impact on United States Research. Implication for YKPP is to have a certain amount of basic and independent research that can interact with monitoring elements,

Neher, Philip A., Ragnar Arnason and Nina Mollett (Eds). 1988. Rights Based Fishing. NATO-ASI series Vol. 169. Kluwer Academic Publishers, Dordrecht, The Netherlands. 541 p.

Proceedings of the NATO Advanced Research Workshop on Scientific Foundations for Rights Based Fishing. Reykjavik, Iceland, 1988. Oriented toward fishing interests and property, particularly Low of the Sea and ocean fisheries. Limited Entry and Quota based fisheries. Although oriented toward ocean fisheries and large fisheries, contains useful concepts of sovereign rights. See Scott.

Nickelson, Tom E., M. F. Solazzi, and S. L. Johnson. 1986. Use of Hatchery Coho Salmon (*Oncorhynchus kisutch*) Presmolts to Rebuild Wild Populations in Oregon Coastal Streams. Can. J. Fish. Aquatic Sci. 43(12):2443-2449.

Evaluation of the effectiveness of using hatchery coho salmonid presmolts to rebuild wild populations in Oregon coastal streams. Juvenile and adult populations were monitored in 15 stocked and 15 unstocked streams from the summer of 1980 until the summer of 1985. Despite similar number s of adults per kilometer in the stocked streams and unstocked streams in the years the presmolts returned to spawn, the resulting densities of juveniles in the stocked streams were significantly lower than the densities of juveniles in the unstocked streams. We concluded that the early time of spawning of the hatchery coho salmonids was largely responsible for their failure to rebuild the populations in the streams stocked with presmolts.

Nickeson, Steve. 1981. Indian Lands: Status, Issues, and Problems. Indian Lands Seminar, Confederated Tribes and Bands of the Yakima Indian Nation, Toppenish, Washington. Management Concepts Inc. 117 p. + app.

Review of the history of Indian lands, American land law, property lay and Indian treaty rights and obligations. Internal seminar on Indian lands sponsored by the Yakima Indian Nation. Review of legislation, legal aspects.

Norman, Donald A. 1990. The Design of Everyday Things. Doubleday. New York, NY. 257 pp.

Smart design is the new competitive frontier and has application in the design of facilities for supplementation technology. Engineering designs often are not thought through from how a human will adapt to the design and use of the technology. This could apply to fish as well as fish managers. Useful considerations for monitoring and evaluation efforts.

Northwest Power Planning Council. 1989. Salmon and Steelhead Production Principles for System Planning. Clarification and Revision Workshop. GENREC/Genetic Resource Consultants. Draft Guidelines. December 15, 1989. Notebook in Sections.

Important Technical guidance developing for Columbia Basin fish genetics.

Northwest Power Planning Council. 1987. Yakima/Klickitat Production Project. Staff Issue Paper, Northwest Power Planning Council, Portland, Oregon.

Nussbaum, Bruce. 1987. The Changing Role of the CEO. Business Week. 3022:13-28.

Nutt, Paul C. 1988. The Effects of Culture on Decision Making. OMEGA 16(6):553-567.

Oglesby, R. T. and C. C. Krueger. 1989. Undergraduate Fisheries Education: Technical Specialization or Broad Foundations. Fisheries 14(5):17-21.

Oregon Department of Fish and Wildlife. 1988. Aquatic Education Program. Three Year Plan. ODFW. 31 p.

Aquatic resources have been highly valued in the state. Increased demands on aquatic resources and habitat have contributed towards the development of a "Stewardship Attitude" and program emphasis. Several aspects related directly to community development and community advisor network as well as for environmental education. Focus on "Watersheds, Wildlife and People", integrate several programs including 1. Adopt a Stream., Stream Scene, Anger Education; STEP and Community Advisory Program; Oh, My Deer; Project Wild; and Outdoor School. Outdoor School is still a weak component.

Oregon Department of Fish and Wildlife. 1982. Comprehensive Plan for Production and Management of Oregon's Anadromous Salmon and Trout. Part I. General Considerations. ODFW. Fish Division.

History and administrative guidelines.

Oregon Department of Fish and Wildlife. 1982. Comprehensive Plan for Production and Management of Oregon's Anadromous Salmon and Trout. Part II. Coho Salmon Plan. ODFW. Fish Division. Sections. SH348 .O64.

Details of Coho production, growth, harvest. Statistics. The program is multifaceted and shows that several approaches may be used to consider production and management efficiencies. Interaction with communities and volunteer groups should be considered as part of the overall process. Shows that STEP and other volunteer groups may be an important consideration Implication for YKPP is to evaluation the several interactive elements. Modern production methods also of critical research and production importance.

Orians, Gordon H. 1989. Tribal Issues in Aquaculture and the Environment. A Conversation with Bob Whitener. The North- west Environmental Journal 5(1):111-123.

Robert W. Whitener, Jr. is the Fish and Wildlife manager for the Squaxin Island Tribe. He is a panel member of the Pacific Salmon Treaty, and on the Northwest Indian Fisheries Commission. Tidelands use for aquaculture.

Orians, Gordon H. 1986. The Place of Science in Environmental Problem Solving. Environment. 12-17+ 38-41.

Pace, R. Wayne. 1983. Organizational Communication: Foundations for Human Resource Development. Prentice Hall, Englewood Cliffs, New Jersey, U. S. A. 286 p.

Pacific Northwest Regional Commission. 1980-81. Forest Policy Project. Five Vol. Washington State University.

Parker, G. A. and M. Begon. 1986. Optimal Egg Size and Clutch Size: Effects of Environment and Maternal Phenotype. Am. Nat. 128(?):573-592.

Pasmore, William A. 1986. A Reply to Glassman and Lundberg's Fable. Group and Organization Studies. 13(1):19-23.

Pasmore response to article by Glassman & Lundberg. Discusses values in organizations. Pasmore says that any effort by consultants to intervene in an organization has to rest upon values agreement: "... unless we can reach some

agreement at a values level, we should probably reconsider whether or not there is a link between your interests and our approach."

Pasmore lists some of the values he believes to be universal:
People should be treated with respect and dignity.
Commitment follows participatory decision making.
Adequate pay and profit sharing.
Technology requires people to make it work.
Innovation and flexibility.
Monitoring the external environment.
Cooperation over conflict.
Intervention to stop destructive conflict.
Environment influences attitudes.
Holistic, integrated organizational view.
References to Maslow's hierarchy of human needs.

Peters, Tom. 1987. Thriving on Chaos: Handbook for a Management Revolution. Harper and Row. New York, NY U.S.A. 708 pp.

For dynamic organizations a strong training program is essential. Skill level assessment key to strategic planning. . Training budget should come before capital budget. Training used to teach organizational values. Training supervisors is critical.

Skilled workers must be involved to achieve organizational growth. Leaders must set vision . Also importance of paying for productivity. Scraps job descriptions or at least simplify in public sector. Replace with a group contract. This might have application to unit implementation of the operating plan.

Piper, R. G., I. B. McElwain, L. E. Orme, J. P McCraren, L. G. Fowler and J. R. Leonard. 1983. Fish Hatchery Management. U.S. Department of the Interior, Fish and Wildlife Service.

Critical document to Fish Hatchery management. Shows important of FWS Technical Centers towards leadership and technical guidance.

Pollock, Marcy, and Nina L. Colwill. 1987. Participatory Decision Making in Review. Leadership and Organizational Development Journal 8(2):7-10.

Porras, Jerry I. 1987. Stream Analysis. A Powerful Way to Diagnose and Manage Organizational Change. Addison-Wesley Pub. Co. Reading, Massachusetts, U. S. A. 163 p.

Stream analysis has now been shown to be useful in separating administrative components in the Yakima Klickitat Production Project. Administrative design is significantly improved by this technical enhancement program.

Organizational Development series. The stream analysis approach is rooted in systems theory. It assumes that organizations are open systems, that they consist of various subsystems, each of which can be characterized as consisting of streams of similar variables, that many of these variables are connected, either causally or relationally, to other variables.

Book is complemented by a computer program that may be useful for the project. Implication for YKPP is that organizational development that is more of a dynamic process may be useful in delineating functional and communication aspects of the project that have eluded analysis thus far. A more detailed structural analysis may assist in developing new communication structures and a refined developmental plan.

Potter, Christopher C. 1989. What is Culture: And Can it Be Useful for Organizational Change Agents? Organizational and Development Journal. 10(3):17-24.

Pressman, Jeffrey L. and Aaron B. Wildavsky. 1973. Implementation. University of California Press, Berkeley, CA. 182 pp.

Rank, A. Dennis. 1982. Assessment of the Community Economic Development Program. Report done under contract to the Department of Fisheries and Oceans, Vancouver, B.C., Canada. May, 1982. 119 p.

Evaluation of the Community Economic Development Program (CDEP) and community involvement program with native peoples. Both economic development and the community advisor network are important. Initiated by a Native Project Pilot Program, funded jointly by the Department of Fisheries and Oceans and by Canada Works.

Rashford, Nicholas S. and David Coghlan. 1987. Enhancing Human Involvement in Organizations- A Paradigm for Participation. Organizational Development Journal 8(1):17-21.

Redeker, Ross. 1986. Hewlett-Packard's Quality Team Program. in Berger, Roger W. and David L. Shores (editors). *Quality Circles: Selected Readings*. Marcel Dekker, Inc, New York. pp. 234-239.

Reeves, Gordon H. and Terry D. Roelfs. Influence of Forest and Rangeland Management on Anadromous Fish Habitat in Western North America. Rehabilitating and Enhancing Stream habitat: 2. Field Applications. USDA, Forest Service, PNW-140. 38 p.

Average text on enhancing stream habitat. General, but a useful educational tool and teaching resource. Several of the papers in this series may be used in educational programs at different levels of involvement.

Rehder, Robert; Marta Smith and Katherine Burr. 1989. A Salute to the Sun. Leadership and Organization Development Journal. 10(4):17-27.

Reinhardt, Uwe. 1987. Lessons for Hospital Payment from Ornithology;" J. Policy Analysis and Management. 6(3):449.

Reinhardt points out the difference between direct and indirect service provision with a cartoon drawn by his children, showing two methods of feeding birds. Reinhardt's point is that helping people takes precedence over helping providers.

Reisenbichler, R. R. 1981. Columbia River Salmonid Broodstock Management: Annual Progress Report. National Fishery Research Center, Seattle, Washington. U. S. Fish and Wildlife Service.

Research perspective by modern research group. Implication for YKPP is to compare and contrast functional elements developed by both NMFS and FWS for their ongoing programs. Differences in research perspectives are important.

Reisenbichler, R. R. and J. D. McIntyre. 1977. Genetic Differences in Growth and Survival of Juvenile Hatchery and Wild Steelhead Trout, Salmo gairdneri. J. Fish Res. Brd Canada. 34:123-128.

Good classic paper on genetic differences in growth and survival. Comparison of hatchery and wild fish is useful in delineating objectives of YKPP. Implication for YKPP is to pay closer attention to fisheries interactions in the stream. General objectives of EDWG apply.

Reisenbichler, R. R. and S. R. Phelps. 1987. Genetic Variation in Chinook, *Oncorhynchus tshawytscha* , and Coho, *O. Kisutch* , Salmon from the North Coast of Washington. Fishery Bull. 85(4):681-701.

For coastal Washington State, 55 loci were examined for electrophoretically detectable variations. Six were polymorphic in Chinook Salmon and three in Coho Salmon. The data suggest that summer Chinook salmon were electrophoretically different from fall Chinook salmon.

Reiser, D. W. and T. C. Bjornn. 1979. Influence of Forest and Rangeland Management on Anadromous Fish Habitat in Western North America. 1. Habitat Requirements of Anadromous Salmonids. USDA, Forest Service, Gen. Tech Report PNW-96. 54 p.

Useful reference on habitat requirements of salmonids. General, but good for education and discussion.

Reitzfeld, Milt. 1989. What's the Best Size and Type of Organization? J. Systems Management 40(9):19.

Ricker, W. E. 1972. Hereditary and Environmental Factors Affecting Certain Salmonid Populations. In: R. C Simon and P. A. Larkin (Eds). The Stock Concept in Pacific Salmon. H. R. MacMillan Lectures in Fisheries. Institute of Animal Resource Ecology, Univ. of British Columbia, Vancouver, B.C., Canada. pp. 27-160.

The stock concept volume continues to be a critical reference for northwest fisheries. This early recognition of both hereditary and environmental factors has driven the fisheries management agencies for a number of years. The innovative summary of fisheries research is a model.

Robillard, Paul D., M. F. Walter and L. M. Bruckner. 1982. Planning Guide for Evaluating Agricultural Nonpoint Source Water Quality Controls. Thomas E. Waddell, Project Officer. Environmental Protection Agency, Office of Research and Development. Environmental Research Laboratory, Athens, Georgia. EPA 600/3-82-021. 733 p.

Planning and design for non-point control options relative to section 208 of the FPWCA amendments. Includes recommendations for irrigated and non-irrigated croplands. The manual focuses on three key pollutant categories: crop nutrients, sediment and salts, all of which are important to YKPP. This manual particularly useful for definitions and planning approaches.

Broad application of Non-point source criteria apply to many factors of the Yakima Basin. Similarities to the USGS NAWQA program and problem identified for hatchery water apply in this case. Water is an important part of the YKPP project, and some of the key features apply to the lower basin. Release factors for hatchery fish may apply as well. Agricultural emphasis of the document is applicable to the irrigation interests and problems of the Yakima Basin.

Robson, Mike. 1984. Quality Circles in Action. Gower Publishing Company, Aldershot, England. 167 pp.

Rogers, David L. and David A. Whetten and Associates. . 1982. Interorganizational Coordination. Theory, Research, and Implementation. Iowa University Press, Ames Iowa, U.S.A. 206 p.

What is the utility of coordination? What are the assets and liabilities. Whose interests are served? What factors facilitate or hinder successful coordination? What are the consequences? What models of coordination have been proposed, and how do they compare?

Rosenthal, Steven R. 1988. Producing Results in Government: Moving Beyond Project Management and Its Limited View of Success. Journal of Policy Analysis and Management. 7(2):110-115.

Rosenthal points out the difference between continuous production and projects. In the YKPP, we have both. The mundane production of fish is a continuous process. The research aspect is more intense.

What considerations can be shown for evaluation of science?The scientific inquiry will be rather schizophrenic - ongoing monitoring of hatchery operation and genetic populations, along with various projects such as supplementation trials, etc. Rosenthal is concerned that projects get all the attention, while continuous operations are left unexamined: "... (project) goals are often glamorous, and their glorious completion or ignominious failure is headline-grabbing stuff." "They (projects) inherently generate more enthusiasm quite simply because it is more fun to build anew or make major changes than to maintain or tinker with an ongoing program." "Producing results is too readily taken to mean success in completing a project rather than in running an ongoing program."

Rubenstein, Sidney P. 1986. Integrating Quality Control and Quality of Work Life. in Berger, Roger W. and David L. Shores (editors). *Quality Circles: Selected Readings*. Marcel Dekker, Inc, New York. pp. 320-326.

Ryman, N. 1970. A Genetic Analysis of Recapture Frequencies of Released Young of Salmon(Salmo salar L.). Hereditas 65:159-160.

Ryman, N. and F. Utter (Eds). 1987. Population Genetics & Fishery Management. Univ. of Washington Press, Seattle, Washington,

Ryman, N. and G. Stahl. 1980. Genetic Changes in Hatchery Stocks of Brown Trout (*Salmo trutta*). Can. J. Fish Aquatic Sci. 37(1):82-87.

Sainsbury, K. 1989. The Ecological Basis of Multispecies Fisheries, and Management of a Dermersal Fishery in Tropical Australia. In: J. A. Gulland (Ed.). Fish Population Dynamics. John Wiley & Sons, Chichester.

Sanders, Howard L. (1986). Draft Report. The Climate of Science. Woods Hole Oceanographic Institution. 50 p. DRAFT

Very important review of the climate of science and factors which drive successful research. Levels of inefficiencies for research are discussed. Increase in reporting procedures and necessity to document progress slows research. Increasing numbers of proposals, especially small proposals makes high administrative demands on best researchers, often reducing productive time by 80%, Research dwindles as a result of political and administrative demands.. Reports in the literature increasingly short, multi-authored. Gradually there have been increasing number of multiauthored papers which show more than just cooperation. Intensity and competitiveness of science in this situation creates a climate for bits and pieces and not concepts and summary review. Notes the importance of the peer review process in scientific progress.

Sargent, R. C, M. R. Gross and E. P van den Berghe. 1986. Male Mate Choices in Fishes. Animal Behavior 34:545-550.

Sargent, R. C., P. D. Taylor and M. R. Gross. 1987. Parental Care and the Evolution of Egg Size in Fishes. Am. Nat. 129(1):32-46.

General discussion of the egg size problem. Eggs and egg size and mortality are a significant concern for YKPP. See Flemming paper.

Sasaki, Naoto and David Hutchins. 1984. The Japanese Approach to Product Quality: Its Applicability to the West. Pergamon Press, Oxford, England. 134 pp.

Schnaars, Steven P. 1989. Megamistakes. The Free Press, New ;York, NY, U.S.A.

People overlook the obvious; they get caught up in zeitgeist and lose their heads, predicting all sorts of outlandish things and overlooking what is really obvious. What drives social, technical and economic change is the mundane sort of thing such as the fact that a product or invention may not be useful, even though it might be on the cutting edge of technology. Nuclear powered can openers will probably not catch on.

Senn, Harry G. and R. Hager. 1976. Comparison of Sea Water with Fresh Water in Rearing Chum Salmon Smolts. Prog. Fish. Cult. 38(2):108-109.

Scheffer, Victor B. Environmentalism: Its Articles of Faith. 1989. The Northwest Environmental Journal 5(1):99-109.

Former U. S. Fish and Wildlife Service researcher. Guidelines of the environmental movement related to certain natural resources. Points to other essays related to the impractical and unattainable component of the study.

Scott, Anthony. 1988. Conceptual Origins of Rights Based Fishing. In: P. A. Neher, R. Arnason and N. Mollett.(Eds). Rights Based Fishing. NATP ASI series Vol. 169. Kluwer Academic Publishers, Dordrecht, Netherlands. pp. 11-38.

For western fishing interests, exclusive property rights may have yielded with the Magna Carta of 1215. Increasing pressure has developed a series of initiatives including Licence and Limited Entry, Quotas and Territorial Use.

Schumacher, E.F. 1975. Small Is Beautiful: Economics As If People Mattered. Harper & Row, New York. 290 pp.

Schwiebert, Ernest. 1977. Columbia River Salmon and Steelhead. Proc. of a Symposium, held in Vancouver Washington, March, 1976. Spec. Publ. No. 10. Am. Fish. Society, Washington, D. C. 214 p.

Simon, R. C. and P. A. Larkin. 1972. The Stock Concept in Pacific Salmon. H. R. MacMillan Lectures in Fisheries. Institute of Animal Resource Ecology, Univ. of British Columbia, Vancouver, B.C., Canada. 231 p.

See Ricker(1972) for full development. A Critical document in the management of northwest fisheries.

Smith, Glenn R. and Brian H. Kleiner. 1987. Differences in Corporate Cultures and their Relationship to Organizational Effectiveness. Organizational Development Journal 8(5):10-12.

Smith, R. W. 1984. Environmental Contaminants, Hazardous Chemicals and the Public Trust Doctrine. Proceedings of the 1984 Hazardous Material Spills Conference, pp. 261-266.

The Comprehensive Environmental Response, Compensation and Liability Act of 1980- (CERCLA) includes language and support for a broad range of trust relationships among Federal and State agencies. For the YKPP, this includes the Trusteeship usually implied for the Indian lands and waters. Discusses trust relationships for natural resources.

Smith, R. W. 1983. Characteristics of Resource Protection Plans: An Analysis of Methods. Proceedings of the 1983 Oil Spill Conference. American Petroleum Institute, Washington, D. C. pp. 171-174.

Increasing diversity in planning elements is documented. Resource protection plans should include elements for evaluation and improvement.

Snow, C. P. 1959. The Two Cultures and the Scientific Revolution. Cambridge Univ. Press, Cambridge, U.K.

Even C.P. Snow can have a contribution to the scientific process. Useful perspective on scientific processes from the literary viewpoint.

Soin, S. G. 1971. Adaptational Features in Fish Ontogeny. Israel Program of Scientific Translations, Jerusalem, Keter Press, Israel. NTIS, Springfield, VA. 72 p.

Russian Translation. General developmental features and early embryology of fishes. Asian Fishes and other species. Freshwater and marine. Especially useful for egg attachment and development. Theoretical.

Sommer, John W. 1988. Bioscientists and Science Policy. Bioscience 38(7):493-495.

The four important issues facing bioscientists appear to be 1. Lack of public understanding of science, which leads to unrealistic hopes and fears about scientific enquiry; 2. Interruptions in research funding, which makes uncertain, and often destroys, the conduct of a research program; 3. Overpoliticising of research, which manifests itself in federally "targeted" research (rather than a broad scope, or in areas of interest to scientists themselves); and, 4. Lack of interdisciplinary training, which may contribute to an insularity of ideas and induce difficulties in communication among scientists. (These four ideas have direct relevance to science and social policy, such as is found in the Yakima PP.) Based on Sigma Xi report, New Haven, CT. (1987).

Staab, Heinz A. 1988. Towards a Climate of Respect and Trust in Scientific Research. Science and Public policy 15(3):144-148.

Case study possibility. The world-famous Max-Plank Society is facing financial difficulty because of budget stagnation. Significant efforts have been required to uphold the research quality. Since 1984, five new institutions were opened and two expanded. Equipment modernization is a major hurdle. The particular situation that supports basic research in FRG (BRD) is somewhat unique. Compare several Max-Plank institutions.

Stahl, G. 1983. Differences in the Amount and Distribution of Genetic Variation Between Natural Populations and Hatchery Stocks of Atlantic Salmon. Aquaculture 33(1):23-32.

Stakman, E. C, R. Bradfield and Paul. C. Mangelsdorf. 1967. Campaigns Against Hunger. Belknap Press of Harvard Univ. Press, Cambridge, Massachusetts, U.S.A., 328 p.

TenDam, H. W. 1987. Managerial Flexibility: A Strategic Asset. Leadership and Organizational Development J. 8(2):11-16.

Thompson, Philip C. 1982. Quality Circles. Amacom, New York. 198 pp.

Townsend, Patrick L. 1986. Commit To Quality. John Wiley & Sons, New York. 189 pp.

Tullock, Gordon. 1966. The Organization of Inquiry. Duke Univ. Press, Durham, North Carolina, U.S.A., pp.

Turnipseed, David L. 1988. An Integrated, Interactive Model of Organizational Climate, Culture and Effectiveness. Leadership and Organizational Development J. 9(5):17-21.

U. S. Congress. 1980. Pacific Northwest Electric Power Planning and Conservation Act. 96th Cong. Public Law 96-501. 16 USC 839.

U. S. Department of Agriculture. Cooperative State Research Service. 1990. Food and Agriculture Competitively Awarded Research and Education Grants. Fiscal Year 1989. USDA, Cooperative State Research Service, Office of Grants and Program Systems. January 1990. 211 p.

Section on Food and Agriculture Sciences National Needs Graduate Fellowships Grant Program, and Peer Review Scientist listing.

U. S. Department of Agriculture. Cooperative State Research Service. 1989. Special Research Grants Program for Fiscal Year 1990; Solicitation of Applicants. Federal Register Monday Dec. 11, 1989. Part IX pp. 50994-5504.

Outlines emphasis for 1990-1995. Note on peer review panels.

U. S. Department of Agriculture. Cooperative State Research Service. 1988. Special Research Grants Program; Administrative Provisions. Federal Register Thursday, December 8, 1988. Part II. pp. 49640-49642.

Administration of science and granting procedure. Special Research Grants program has particular emphasis valuable to the operation of both the governmental liaison of the YKPP and the potential of an independent foundation.

U. S. Department of Agriculture. Cooperative State Research Service. 1985. Special Research Grants Program; Administrative Provisions. Federal Register, Part IV, Friday, February 8, 1985. pp. 5498-5504.

Special programs and program emphasis. Note difference between years.

U. S. Department of Agriculture. Cooperative State Research Service. 1989. Competitive Research Grants Program for Fiscal Year 1990; Solicitation of Applications for the Competitive Research Grants Program Federal Register, Wednesday, November 8. 1989, Part IV. p. 47066-47070

Competition for research funds external to State based research stations. Guidelines for proposals. Review procedures. See notations below on evaluation factors and peer review process. Implication for YKPP is to have a more formal evaluation and peer review process in concert with BPA. Federal role could be enhanced to include a broader Federal interactive process with other research elements.

Compare the utility of the Research Grants program as a federal program, as an Indian program, and as an independent foundation. The peer review process has application to both education and cooperation both within and without existing administrative groups. The interest is not necessarily in the research grants program itself, but in the fact that it is successful. Our interest is particularly keen if an independent research institute is developed to support both fisheries and allied aquatic sciences.

U. S. Department of Agriculture. Office of the Secretary. 1984. Competitive Research Grants Program; Administrative Provisions. Federal Register, Monday February 12, 1984, Part VI, pp. 5570-5577.

Outlines Evaluation Factors: Scientific merit; Conceptual Adequacy of hypothesis; Suitability and feasibility of Methodology and Appropriateness of techniques. Objectives and approach include Scientific Soundness or information value; Novelty, uniqueness and originality; Adequacy of description of the undertaking. Human and Physical resources include Qualifications of P.I and key project personnel; Time allocation; Institutional experience and competence in the subject area; Adequacy of available or obtainable support personnel, facilities and instrumentation; Likely efficiency of resource utilization. Impact of anticipated results includes Relevance of research itself to practical needs; Scientific contribution of research in leading to important discoveries or significant breakthroughs in announced program areas. Probability of success of project. Economic feasibility for near-term application.

Criteria for peer review group members include factors: a. The level of formal scientific or technical education; b. The extent to which the individual has engaged in relevant research, the capacities in which the individual has done so (P.I., staff), and the quality of such research; c. Professional recognition as reflected by awards and other honors received from scientific and professional organizations outside the Department; d. The need of the group to include within its membership experts from various areas of specialization within relevant scientific or technical fields; e. The need of the group to include within its membership experts from a variety of organizational types (e.g. Universities, industry, private consultants) and geographical locations; The need of the group to maintain a balanced membership (minority, female, age distribution).

Conflict of Interest is identified. No member of a peer review group may participate in any review under this part of a specific grant application for which the member has had or is expected to have any other responsibility or

involvement as an employee of the Untied States. (The Secretary may waive this provision if needed for obtaining expert advice).

U. S. Department of the Army. 1976. Inventory of Riparian Habitats and Associated Wildlife Along Columbia and Snake Rivers. U. S. Army, Corps of Engineers, North Pacific Division. 1976. 5 Vol.

Basin inventory includes riparian vegetation and wildlife parameters. Useful documentation tool for conditions of certain reaches. Points to the lack of consistent research data available over the long-term. Points to a possible role for CE in continuing riparian corridor and vegetation studies in streams.

U.S.Department of Commerce. 1988. Announcement of Research Opportunities in the National Estuarine Reserve Research System for Fiscal Year 1989. U.S. Dept. of Commerce, NOAA, NOS, Office of Ocean and Coastal Resource Management, Washington, D.C. 16 p.

National research priorities compared to local priorities. Interview with Michael Graybill, Sanctuary Manager. Follow-up with Washington, D.C. evaluation. Evaluation process includes a panel peer review. Separation of Selection committee from local influences.

National Research Priorities focus on Water Management, Sediment management, Nutrients and Other Chemical Inputs, Coupling of Primary and Secondary Productivity, and Estuarine Fishery Habitat Requirements. National submission of proposals evaluated by peer review committee. (Actual sanctuary has little influence in acceptance and funding). Each sanctuary has a Research Advisory Committee to review proposals. Other recognized experts evaluate the proposal. Selection criteria include: 1. Scientific Merit; 2. Importance of Management; 3. Relevance to National Research Priorities. 4. Technical Approach. 5. Qualifications of P.I. and Personnel. 6. Institutional Support and Capabilities. 7. Budget. (No mention of adherence to sanctuary master plan).

U. S. Department of the Interior, Bureau of Indian Affairs. 1988. Tribal hatcheries in Washington State. A Photographic Inventory of Fisheries Enhancement Facilities . U.S. BIA, Portland Area Office, Branch of Fisheries. 110 p.

Summarizes costs and funding sources, production, employees.

U. S. Department of Energy; Bonneville Power Administration. 1990. Yakima/Klickitat Production Project. Preliminary Design Report. BPA, Division of Fish and Wildlife, April, 1990, Portland, Oregon. 6 volumes.

U. S. Department of Energy; Bonneville Power Administration. 1989. Draft Environ-mental Assessment. Yakima/Klickitat Production Project. BPA, Office of Power Sales. June 1989. 106 p + APP.

U. S. Department of Energy; Bonneville Power Administration. 1988. Yakima/Klickitat Production Project Public Information/ Involvement Plan. BPA, Portland, Oregon.

U. S. Department of Energy; Bonneville Power Administration. 1981. Pacific Northwest Electric Power Planning and Conservation Act with Index. Bonneville Power Administration. DOE/BP-67.

U. S. Department of the Interior, Fish and Wildlife Service. 1989. Lower Snake River Compensation Plan Office, Annual Report. FY 1989. U. DOI, FWS, Boise, Idaho. Dated 11/27/89. 15 + pp.

FWS example of current compensation planning effort and agreement. Lacks detailed information on the management process and goals of the program in relation to current efforts. Lower Snake River Compensation is an important element in FWS policy and mitigation initiatives. Implication for YKPP is to review Snake River compensation legal structure and management structure in relation to tribes, Umatilla Project, and other elements. Contributes to critical element of the Snake River contribution to fisheries.

U. S. Department of the Interior. 1989. Resources Management Plan Guideline. U.S.DOI, National Park Service. 11 p. plus Technical Supplement. See Research Administration NPS-77.

NPS Research Program objectives are centered on the understanding of ecosystem processes so that managers will be able to make cogent decisions regarding the preservation and maintenance of NPS natural and cultural resources.

Mechanisms of Research Implementation include: NPS Research Staff; Cooperative Park Service Units at Universities; Contract Research; Cooperative Agreement with Agencies and States; Inter-agency Agreement -Federal Agencies (NPS-20); Memorandum of Understanding (MOU); Memorandum of Agreement (MOA) - Receipt of Funds; Independently Funded Research. Situation changes with large on-site research staffs, such as might be found in the Everglades NP, Yellowstone, NP. (Compare to NPS research facilities)

U. S. Environmental Protection Agency. 1982. Planning Guide for Evaluating Agricultural Nonpoint Source Water Quality Controls. Thomas E. Waddell, Project Officer. Environmental Protection Agency, Office of Research and Development. Environmental Research Laboratory, Athens, Georgia. EPA 600/3-82-021. 733 p. (see primary authors, Robillard, Paul D.,et al.)

Document contains important implications for irrigated land and non-point agriculture. Considerations on organizational arrangements are important to the YKPP structure at the administrative level. Several important considerations on water and resource use can be seen.

Utter, Fred, G. Milner, G. Ståhl and D. Teel. 1989. Genetic Population Structure of Chinook Salmon, *Oncorhynchus tshawytscha* , in the Pacific Northwest. Fish. Bull. 87(2):239-264.

Variation at 25 polymorphic protein coding loci was examined for 86 populations of Chinook salmon, *Oncorhynchus tshawytscha* , ranging from the Babine River in British Columbia to the Sacramento River in California. Substantial differences in allele frequencies identified patterns of genetic variability over the geographic range of the study. Nine major genetically defined regions were located. The persistence of these geographic patterns in the face of natural opportunities for introgression, and sometimes massive transplantations, suggests that genetically adapted groups within regions have resisted large-scale

introgression from other regions. Repopulation of deglaciated areas is discussed. Important paper for Columbia River perspective. See Milner, 1981.

Vagtborg, H. 1973. The Story of Southwest Research Center. A Private, Nonprofit, Scientific Research Adventure. Editorial and Publications Processing Unit. Southwest Research Institute, Texas Univ. Press. Austin, Texas, U.S.A., 610 p.

This private organization includes focus on interaction, publication and organization of conferences. Information flow includes professional interaction at the highest international levels. Skillful utilization of meetings, seminars and symposia contribute to information flow and research advances.

Vancil, Richard F. 1987. A Look at CEO Succession. Harvard Business Review. 65(2):107-117.

van den Berghe, E. P., and M. R. Gross. 1986. Length of Breeding Life of Coho Salmon (*Oncorhynchus kisutch*). Can. J. Zool. 64(?): 1482-1486.

van den Berghe, E. P. and M. R. Gross. 1989. Natural Selection Resulting from Female Breeding Competition in an Pacific Salmon (Coho: Onchorynchus kisutch). Evolution 43(1):125-140.

Vannote, Robin L, G. Wayne Minshall, Kenneth W. Cummins, James R. Sedell and C. E. Cushing. The River Continuum Concept. Can J. Fish. Aquatic Sci 37(2):130-137.

Vaziri. M T. 1987. Productivity Improvement Through Quality Control Circles: A Comparative Approach. Leadership and Organization Development J. 8(5):17-19.

Vogt, Judith F. and Stephen J. Griffith. 1988. Team Development and Proactive Change: Theory and Training Implications. Organization Development Journal 6(4):81-87.

Wagner, Harry H. 1967. A Summary of Investigations of the Use of Hatchery-Reared Steelhead in the Management of a Sport Fishery. Oregon State University, Corvallis, Oregon, Oregon State Game Commission. Research Division. Fishery Report Number 5, January, 1967 62 p.

Wagner, Harry H. 1977. Options for Managing the Anadromous Fisheries for the Lower Deschutes River. In: Ernest Schwiebert, Ed, Columbia River Salmon and Steelhead. Proceedings of a Symposium, held in Vancouver Washington, March, 1976. Special Publication No. 10. American Fisheries Society, Washington, D. C. 214 p.

Wahle, Roy J. and Robert. Z. Smith. 1979. A Historical and Descriptive Account of Pacific Coast Anadromous Salmonid Rearing Facilities and a Summary of Their Releases by Region, 1960-1976. U. S. Dept. of Commerce, NOAA, National Marine Fisheries Service, NOAA Tech. Rep. NMFS SSRF-736.

Walters, C. J. 1986. Nonstationarity of Production Relationships in Exploited Populations. Can. J. Fish. Aquatic Sci 44(Suppl 2):156-165.

Walters, C. J., J. S. Collie and T. Webb. 1988. Experimental Designs for Estimating Transient Responses to management Disturbances. Can J. Fish. Aquatic Sci. 45:530-538.

Walton, Mary. 1986. The Deming Management Method. The Putnam Publishing Company, New York NY, U.S.A.. 249 pp.

The evolution of Japanese system of quality control and the management principals for quality control are addressed, as well as some some of their applications in the United States in the private sector. Various tools to be used in quality circle management are explored.

Ward, B. R.., P. A. Slaney, A. R. Facchin, and R. W. Land. 1989. Size-Based Survival in Steelhead Trout (*Oncorhynchus mykiss*); Back-Calculated Lengths from Adults' Scales Compared to Migrating Smolts at the Keogh River, British Columbia. Can J. Fish. Aquatic Sci. 46:1853-1858.

Useful methods and evaluation of survival. Survival is still a debatable question that has much technical improvement to be gained along the entire Columbia River Basin and tributary systems.

Warren, Charles E. 1971. Biology and Water Pollution Control. W. B. Saunders Co, Philadelphia, Pennsylvania, U.S.A., 434 p.

Important reference on river systems and pollution control, particularly in the western United States.. Summarizes significant technical evaluations and some little known programs form the 1960s period. .Useful also in education and training.

Washington State University. 1981. Forest Policy Project. Five Vol. Funded by the Pacific Northwest Regional Commission. Vancouver, Washington. var pp.

Important summary report that separates forest policy from economic trends. The study was divided into seven modules, published somewhat separately. Considers economic, demands, supply and economic trends. Lacks riparian view. and consideration of endangered species and wetlands.

Study Modules I. Forest Policy Institutions. 1980.
Study Module IIA. Demand for Pacific Northwest Timber and Timber Products.
Study Module IIIA. Supply of Pacific Northwest Timber.
Study Modules IIB and IIIB. Economic Analysis of Nontimber Uses of Forest Land in the Pacific Northwest.
Study Module IV. Socioeconomic and Environmental Impacts of Forest-Based Activities.
Study Module V. Alternative Forest Policies for the Pacific Northwest.

Weiss, Janet A. 1987. Pathways to Cooperation Among Public Agencies. J. Policy Analysis and Management, 7(1):94-117.

Weiss says that there are certain "forces" that push public agencies to cooperate. (p.95) Weiss notes that cooperation requires time and resources, and may therefore be resisted. Agencies must be coaxed or coerced into cooperation; it is not a natural desire to cooperate. The YKPP implication is that some cooperative mechanisms and corresponding funding should be built in to the administrative design, if it is determined that specific mechanisms for cooperation are necessary.

Werther, William B. 1986. Quality Circles and the Corporate Culture. in Berger, Roger W. and David L. Shores (editors). *Quality Circles: Selected Readings*. Marcel Dekker, Inc, New York. pp. 91-101.

White, E. B. 1962. The Points of My Compass. Harper and Row, New York, NY, U.S.A.

Wilkinson, Charles F and H. Michael Anderson. 1985. Land and Resource Planning in the National Forests. Oregon Law Review 64(1 & 2):1-373.

Important document on natural resource planning and considerations in complex environments. Evolution of policy an important element. Conflicts over resource use vary by region. Planner face different challenges according to location. A major competing resource may be recreation, which is of great economic value in the western states. In the Pacific Northwest commercial timber production often overshadows other uses. Officials in the Pacific Northwest need to plan for the protection of salmon and steelhead. Only recently has public land policy recognized the importance of reconciling these diverse and often conflicting interests.

Winans, G. A. and J. H. Helle. 1989. Electrophoretic Variation in Sockeye Salmon (*Oncorhynchus nerka*) in northern British Columbia and Southeast Alaska. Fishery Bull ?

Wishard, L., J. Seeb, F. Utter, and D. Stefan. 1984. A Genetic Investigation of Suspected Redband Trout Populations. Copeia 1984( ):120-132.

Withler, F. C. 1982. Transplanting Pacific Salmon. Can. Tech. Rep. Fish. Aquat. Sci. No. 1079. 27 p.

Withler, R. E. 1988. Genetic Consequences of Fertilizing Chinook Salmon (Oncorhynchus tshawytscha) Eggs with Pooled Milt. Aquaculture 68(1):15-25.

Withler, R. E. 1985. Ldh-4 Allozyme Variability in North American Sockeye Salmon (*Oncorhynchus nerka*) Populations. Can. J. Zool. 63( ):2924-2932.

Witzel, L. D., and H. R. MacCrimmon. 1981. Role of Gravel Substrate on Ova Survival and Alevin Emergence of Rainbow Trout, *Salmo gairdneri* . Can. J. Zool. 59(?):629-636.

Witzel, L. D., and H. R. MacCrimmon. 1983. Embryo Survival and Alevin Emergence of Brook, Char(*Salvelinus fontinalis*), and Brown Trout, (*Salmo trutta*), Relative to Redd Gravel Composition. Can. J. Zool. 61:1783-1792.

Wolfe, L. D. S. 1982. Fraser River Estuary Study. A Linked Management System. Technical Background Report - Phase II. Report for the Management Systems Sub-Committee.

Linked management developed from the Phase I inventory of existing conditions. Phase II concerned with the preparation of a management program for recommendation to the Study Council, Federal Minister of Environment and British Columbia Minister or Environment. Management System, Management Needs and Analytical Methods are discussed. See Englander, 1977

Wood, Chris C. 1989. The Utility of Similarity Dendrograms in Stock Composition Analysis. Can J. Fish Aquatic Sci 46

Wood, Chris C., D. T. Rutherford and S. McKinnell. 1989. Identification of Sockeye Salmon (*Oncorhynchus nerka*) Stocks in Mixed-stock Fisheries in British Columbia and Southeast Alaska using Biological Markers. Can J. Fish. Aquatic Sci 46(12):2108-2120.

Yager, Edwin G. 1986. Quality Circle: A Tool for the 80s. in Berger, Roger W. and David L. Shores (editors). *Quality Circles: Selected Readings*. Marcel Dekker, Inc, New York. pp. 42-45.

Yakima/Klickitat Production Project. 1990a. Experimental Design Plan for the Yakima/Klickitat Production Project. Second Annual Report. YKPP, Experimental Design Work Group. January 1990. Battelle, Pacific Northwest Laboratory, Richland Washington, 99352. 81 + App.

EDWG evaluation of the YKPP project and project design. Compare design with facilities. Supplementation program discussed in relation to habitat, research and production. General goals reviewed. Discussion of project objectives and division of research goals is particularly useful. Overall objectives of the project are sound. Weakness in professional interaction and communication is a major project for administrative design. Historical lake of scientific coherence on the Columbia River is evident.

Yakima/Klickitat Production Project. 1990b. Report to the Northwest Power Planning Council on Refined Goals and Harvest Management Plan for the Yakima/Klickitat Production Project. Prepared jointly by: Yakima Indian Nation, Fisheries Management Program; State of Washington, Department of Wildlife; State of Washington, Department of Fisheries. February 1990. 67 pp.

Guidance for the refined administrative goals for the Yakima/Klickitat Production Project. Joint preparation shows some administrative weakness, some of which is addressed in the administrative design report.

Yakima/Klickitat Production Project. 1990 c. Interim Report. Yakima Klickitat Production Project. Administrative Design Report. J. Churchill, S. Edner, L. Shissler, and R. W. Smith, contributors. Portland State University, School of Urban and Public Affairs. Portland, Oregon.

Interim and Preliminary Administrative Design. Summary of Delphi interviews and bibliography. Includes annotations relating to both fisheries, science and administrative design. Summaries of meetings with principal agencies and work groups on administrative structure. Top Box exercise is reviewed.

Yakima/Klickitat Production Project. 1990d. Final Report. Yakima Klickitat Production Project. Administrative Design Report. J. Churchill, S. Edner, L. Shissler, and R. W. Smith, Contributors and Editors. Portland State University, School of Urban and Public Affairs. Portland, Oregon. Several Appendices.

Final Administrative Design Recommendations. Included in the bibliography for correct reference and citation within the report. Shows significant incorporation of comment from the interim draft.

YAKIMA-KLICKITAT PRODUCTION PROJECT

ADMINISTRATIVE DESIGN GROUP

APPENDIX E

SCORING MATRIX FOR RATING INSTITUTIONAL ALTERNATIVES

Explanation of Scoring Matrix.

For each organizational component recommendation, we estimated the likelihood that a particular institutional alternative would meet the intent of the recommendation and entered that estimate in a spreadhseet. Column totals indicate our estimate of the relative suitability of each institutional alternative from an administrative standpoint.

Options for institutional alternatives are as follows:

A. New non-profit corporation. This alternative would require that a corporation be chartered by the State of Washington and the Yakima Indian Nation under the Interlocal Cooperation Act, Chapter 39.34 RCW.

B. Status quo. This alternative would continue to expand on the present arrangement, where WDF, WDW and YIN cooperatively set policy and contribute personnel with technical and management expertise.

C. Interim USFWS contract. This alternative would involve contracting with the U.S. Fish and Wildlife Service for a limited period, perhaps five years. During this period, YIN technical and administrative systems would be developed, with the expectation that the YIN would become the project manager at the end of the USFWS contract.

D. Contract to a single agency. This alternative would involve contracting to one of the current management agencies - almost certainly the YIN - to operate the project through an O&M agreement directly with BPA.

5. Contract to private operator. This alternative would involve an O&M agreement between BPA and a private corporation other than one of the present management agencies. Policy direction would continue to be provided by WDF, WDW and YIN.

Management options are ranked from 1 to 5, with 1 being "least likely" and 5 being "most likely" to fulfill that recommendation. 3 is "average."						
			OPTIONS			
		A	B	C	D	E
Goals	OA-1	4	4	2	2	2
	OA-2	4	4	2	3	2
	OA-3	4	4	4	3	2
	OA-4	5	4	2	2	2
Stock Enhancement	OA2-1	4	4	3	2	1
	OA2-2	4	4	3	3	3
Information Exchange	OA3-1	4	3	3	2	2
	AO3-2	4	4	2	2	1
	OA3-3	4	4	4	2	2
Strategies	OB-1	4	4	3	3	3
	OB-2	4	3	3	2	2
Build & Manage Facility	OB1-1	3	3	3	3	2
	OB1-2	4	3	3	3	2
	OB1-3	4	3	2	2	2
Demonstration	OB2-1	4	3	3	2	1
	OB2-2	4	3	3	2	1
	OB2-3	3	3	3	3	1
Quality Control	OB3-1	4	3	4	3	2
	OB3-2	4	2	2	2	1
	OB3-3	4	3	3	3	2
Formal Structure	OC-1	3	3	3	3	5
	OC-2	5	4	3	3	2
	OC-3	2	2	3	3	5
Annual Operating Plan	OC1-1	3	3	3	3	2
	OC1-2	4	3	3	3	2
(continued)	OC1-3	3	3	3	3	3

		A	B	C	D	E
MEPG	OC2-1	3	5	2	1	3
	OC2-2	4	5	3	1	3
	OC2-3	4	4	2	2	3
	OC2-4	4	4	3	3	3
	OC2-5	3	3	3	3	3
	OC2-6	5	2	3	2	2
	OC2-7	4	3	2	2	2
Policy Advisory Committee	OC3-1	4	4	3	2	3
Headquarters	OC4-1	3	3	3	3	3
	OC4-2	4	3	2	2	2
	OC4-3	4	3	2	2	2
	OC4-4	4	3	2	2	2
	OC4-5	4	3	2	2	2
	OC4-6	4	3	2	2	2
	OC4-7	4	4	4	3	3
Field Offices	OC5-1	4	4	3	2	2
	OC5-2	3	3	3	3	3
	OC5-3	4	3	4	2	2
EDWG	OC6-1	4	4	3	3	2
	OC6-2	4	4	4	3	3
	OC6-3	4	4	2	3	2
	OC6-4	4	4	4	2	2
	OC6-5	4	4	3	3	2
	OC6-6	4	4	3	3	2
OD Committee	OC7-1	4	3	3	2	1
	OC7-2	4	3	3	2	1
	OC7-3	4	3	3	2	1
Recruitment	OD1-1	4	4	3	2	2
	OD1-2	4	3	2	2	2
	OD1-3	4	3	2	2	2
Training	OD2-1	4	4	4	3	2
	OD2-2	4	3	3	4	2
Growth	OD3-1	4	3	3	2	2
	OD3-2	4	3	3	2	2
Scheduling	OD4-1	4	4	4	3	2
	OD4-2	4	4	4	3	2
(continued)	OD4-3	4	4	4	3	2

		A	B	C	D	E
Pay & Benefits	OD5-1	4	4	4	3	2
	OD5-2	4	4	3	3	2
Tenure	OD6-1	2	2	2	2	2
	OD6-2	3	2	2	2	5
	OD6-3	4	4	3	2	1
Staffing Level	OD7-1	4	4	4	2	2
	OD7-2	4	4	4	2	2
Organizational Culture	SA-1	4	3	3	2	2
	SA-2	4	3	3	2	2
	SA-3	4	3	3	2	1
	SA-4	4	4	3	2	1
Indian/non-Indian Culture	SA1-1	4	4	2	1	1
	SA1-2	4	4	3	4	1
Professional/Subprofessional	SA2-1	4	3	4	2	2
	SA2-2	4	3	3	2	1
	SA2-3	4	3	4	2	1
	SA2-4	4	3	3	4	2
Personal Interaction	SB1-1	4	3	2	2	1
	SB1-2	4	3	2	2	1
Public Interaction	SB2-1	4	4	3	3	3
	SB2-2	3	3	3	3	3
	SB2-3	4	3	2	2	2
	SB2-4	4	4	3	3	3
Formal Communications	SC1-1	4	4	3	3	2
	SC1-2	4	3	3	3	2
	SC1-3	4	2	2	2	1
	SC1-4	5	3	2	2	1
	SC1-5	4	4	3	3	3
Informal Communications	SC2-1	4	4	3	3	2
	SC2-2	5	3	2	2	1
Problem Solving	SC3-1	5	4	3	3	1
Technology Imperatives	TA-1	4	4	4	3	2
Technical Expertise	TA1-1	4	4	4	2	2
(continued)	TA1-2	4	4	4	2	2

		A	B	C	D	E
Job Design	TA2-1	4	4	3	3	1
	TA2-2	5	4	3	3	1
	TA2-3	4	4	3	3	1
Work Flow Design	TA3-1	5	4	3	3	2
	TA3-2	5	3	3	3	3
Technical Guidelines	TB1-1	4	4	3	3	3
	TB1-2	5	4	4	3	3
Technical Procedures	TB2-1	4	4	3	2	2
	TB2-2	4	4	3	2	2
Learning	TC1-1	5	4	3	3	2
	TC1-2	5	4	3	3	2
Monitoring	TC2-1	4	3	3	2	2
Evaluation	TC3-1	4	4	4	3	3
	TC3-2	3	3	3	3	3
	TC3-3	3	3	3	2	2
	TC3-4	3	3	3	2	2
Record Keeping	TC4-1	4	4	4	3	3
	TC4-2	4	4	4	3	3
	TC4-3	3	3	3	3	3
Information System	TC5-1	4	4	4	3	2
	TC5-2	3	3	3	3	3
	TC5-3	4	3	3	2	2
Physical Design	PA1-1	4	4	3	2	2
	PA1-2	4	4	3	3	3
	PA1-3	4	3	1	1	1
	PA1-4	4	3	3	3	2
	PA1-5	3	3	3	3	3
Decentralization	PB2-1	5	3	3	3	1
	PB2-2	5	4	4	3	1
	PB2-3	5	4	3	3	1
OPTION		A	B	C	D	E
SCORE		502	440	378	318	262
RANK		1	2	3	4	5